A Dynamic Computable General Equilibrium (CGE) Analysis of the Trans-Pacific Partnership Agreement: Potential Impacts on the New Zealand Economy

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By:
Anna Strutt[1],
Peter Minor[2], and
Allan Rae[3]

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[1] Associate Professor, University of Waikato; GTAP Research Fellow.
[2] Managing Director, ImpactECON, LLC; GTAP Research Fellow.
[3] Professor Emeritus, Massey University; past GTAP Research Fellow.

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Acronyms

ASEAN	Association of South East Asian Nations
AVE	*Ad valorem* equivalent
CGE	Computable general equilibrium
EIF	Entry into force
EV	Equivalent variation
FDI	Foreign direct investment
FTA	Free trade agreement
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product
GDyn	Dynamic GTAP Model
GTAP	Global Trade Analysis Project
HTS	Harmonised Tariff System
IP	Intellectual property
ISDS	Investor state dispute settlement
MFAT	Ministry of Foreign Affairs and Trade (New Zealand)
NAMA	Non-Agricultural Market Access
NTB	Non-tariff barrier
NTM	Non-tariff measure
OECD	Organisation for Economic Co-operation and Development
RoO	Rules of origin
SPS	Sanitary and phytosanitary
TBT	Technical barriers to trade
TFP	Total factor productivity
TPP	Trans-Pacific Partnership
TRQ	Tariff rate quota
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
US	United States of America

USTR	United States Trade Representative
WTO	World Trade Organisation

Executive Summary

This report, prepared for the New Zealand Ministry of Foreign Affairs and Trade (MFAT), details results from a large-scale economic modelling effort which was undertaken to improve understanding of some potential impacts on New Zealand of entering into a Trans-Pacific Partnership (TPP) agreement.

The TPP negotiations involve New Zealand and eleven other countries that together comprise almost 40 per cent of the world economy: Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, Peru, Singapore, the United States of America and Vietnam. A dynamic computable general equilibrium (CGE) model of the world economy is employed to undertake this analysis, with projections made to the year 2030. We model some potential impacts on the New Zealand economy due to changes that may be brought about by the TPP through:

- reductions in tariff and quota barriers on goods trade;
- reductions in barriers on services trade;
- reductions in non-tariff barriers on goods trade;
- improvements in trade facilitation measures.

We estimate the impact on New Zealand of TPP from these channels only, making use of global modelling techniques that are widely employed by the international trade modelling community. We model the following scenarios:

- Scenario A: Tariff reductions with some dairy tariff rate quota (TRQ) expansion;
- Scenario B: Tariff reductions, plus reductions in barriers to services trade, reductions in non-tariff barriers (NTBs) for goods trade and improvements in trade facilitation;

Each of these scenarios is modelled against a baseline projection of the global economy to 2030 which does not include the impacts of a TPP agreement. Reductions in tariff barriers are modelled using detailed and credible data on tariffs, though simplifying assumptions need to be made in the modelling of TRQs applied to some agricultural exports. Our approach takes into account tariff reductions already committed to in other agreements, which are captured in the baseline; thus the results of these are not attributed to TPP. We also identify sensitive sectors that may be excluded from tariff liberalisation. While reductions in NTBs appear likely to contribute significantly to the benefits from trade liberalisation, caution needs to be used when assessing results generated using currently available modelling techniques and measures of these trade restrictions; therefore, we separate out the impacts of reform in these areas.

Table E.1 summarises the cumulative projected increases in New Zealand's real gross domestic product (GDP) for 2030, due to the TPP liberalisations modelled. Results for Scenario A indicate that in 2030, tariff liberalisation alone may lead to New Zealand's real GDP being 0.21 per cent higher than in the baseline. When we also include liberalisation of NTBs in goods and services trade along with reductions in customs delays in Scenario B, our projections suggest that the 2030 real GDP increase for New Zealand could be 1.42 per cent. For Scenario A, the dollar equivalent of the 2030 increase in real GDP is approximately US$460 million, expressed in constant 2007 dollars, expanding to US$3.1 billion in Scenario B. Table E.1 also converts these values to New Zealand dollars for convenience.

Table E.1

Effects on New Zealand's real GDP, TPP scenarios A and B, cumulative change relative to the 2030 baseline

	Scenario A	Scenario B
	Tariff cuts plus 10% dairy quota expansion	Scenario A plus NTBs and trade facilitation
Per cent	0.21	1.42
Constant 2007 US$ million	459	3,062
Constant 2007 NZ$ million*	624	4,160

**Converted applying a 2007 exchange rate of 0.7361 (calculated using a simple average of series B1 monthly exchange rates from the Reserve Bank of New Zealand).*

Source: Authors' GDyn model results.

Contrasting Scenario A with Scenario B, it is evident that reductions in NTBs and improvements in trade facilitation contribute significantly to the projected impacts of a TPP agreement on New Zealand's real GDP. Research undertaken in this report finds that approximately 70 per cent of total Scenario B results, or nearly 1 per cent of the total 1.42 per cent increase in 2030 real GDP, results from removal of NTBs on goods trade.

Sectoral impacts that include real exports and output are generally found to be positive. Analysis in the report details specific assumptions made for liberalisation of the beef and sheep meat as well as dairy product sectors, reflecting their importance to New Zealand's trade. For Scenario B, our results project a 1.0 per cent increase in real output for beef and sheep meat and a 0.8 per cent increase in output of dairy products, relative to the 2030 baseline.

1. Introduction and Background

This report, prepared for the New Zealand Ministry of Foreign Affairs and Trade, details results from a large-scale modelling effort designed to improve understanding of some potential impacts on New Zealand of entering into a TPP agreement. The specific scenarios modelled were requested by MFAT to reflect anticipated outcomes of the negotiations.

The TPP negotiations involve New Zealand and eleven other countries – Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, Peru, Singapore, the United States of America and Vietnam. These negotiations evolved from efforts to expand the scope of the existing Trans-Pacific Strategic Economic Partnership (P4) Agreement in 2008, with negotiations for an expanded TPP agreement beginning in 2010.

In this study, we model implementation of TPP with the current twelve members. This is a significant regional grouping: current membership of TPP comprises almost 40 per cent of global GDP, approximately one quarter of global trade and just over ten per cent of the world's population (Table 1.1).

Table 1.1
Contribution of TPP countries to the global economy, 2012

	GDP (US$ million)	Exports of goods and services (US$ million)	Imports of goods and services (US$ million)	Population (million)
Australia	1,532,408	325,795	321,908	22.7
Brunei Darussalam	16,954	13,795	5,286	0.4
Canada	1,779,635	541,303	576,307	34.8
Chile	269,869	92,328	91,353	17.5
Japan	5,961,066	873,964	992,054	127.6
Malaysia	305,033	265,794	229,624	29.2
Mexico	1,178,126	387,307	406,082	120.8
New Zealand	171,281	49,045	49,727	4.4
Peru	203,790	52,261	48,567	30.0
Singapore	274,701	551,209	490,307	5.3
United States	16,244,600	2,195,900	2,743,100	313.9
Vietnam	155,820	124,701	119,242	88.8
Proportion of world (%)	38.8	24.0	27.4	11.3

Source: World Bank (2014)

To model potential impacts of a TPP agreement, we employ a dynamic computable general equilibrium (CGE) model of the world economy, with considerable regional and commodity disaggregation and

projections made to the year 2030. This allows us to estimate the projected direction and magnitude of impacts on the New Zealand economy due to due to changes that may be brought about by the TPP through:

- reductions in tariff and quota barriers on goods trade;
- reductions to barriers on services trade;
- reductions to non-tariff barriers on goods trade;
- improvements in trade facilitation measures.

We estimate the impact on New Zealand of TPP from these channels only, making use of global modelling techniques that are widely employed by the international trade modelling community. Other factors that are not considered will also influence the impact of any TPP agreement on New Zealand and a number of potentially important issues lie outside the scope of this report. As such, this report is not intended to be a cost-benefit analysis of the TPP.

Main TPP Negotiating Topics

In 2011, leaders of the (then nine) TPP partners announced the broad outline of an ambitious, 21st century agreement that incorporates next-generation issues and strengthens competitiveness of TPP countries within the global economy. Some key features identified were:

- Comprehensive market access: to eliminate tariffs and other barriers to trade in goods and services, and cross-border investment, and to open markets in government procurement. This includes significant commitments beyond existing World Trade Organisation (WTO) obligations, and elimination of non-tariff measures that serve as trade barriers. Customs procedures are to be transparent and facilitative of trade, and ensure goods are released as quickly as possible. A common set of rules of origin (RoOs) will be sought. Agreement will be pursued in building upon existing WTO agreements in regards to Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT).
- TPP is to be a fully regional agreement, negotiated as a single undertaking.
- Cross-cutting trade issues: regulatory coherence to make inter-partner trade more efficient and seamless; encouragement of the participation of small and medium business enterprises in regional trade; enhance domestic and regional competitiveness and promotion of economic growth and higher living standards; and advancement of TPP countries' economic development priorities.
- New trade issues involving innovative products and services including those related to the digital economy and green technologies. Trade and environment challenges will be addressed.
- The need to address sensitivities and unique challenges faced by developing countries, such as technical assistance and trade capacity building requirements.
- TPP is to be a living agreement which can evolve to facilitate extension to new trade issues and new countries.

Our Approach and Limitations

Several, but not all, of the key TPP negotiating topics outlined above are considered in our analysis: tariffs on goods trade are reduced or eliminated in a fully regional approach with sensitive products identified; non-tariff barriers restricting trade in agricultural and non-agricultural goods are reduced and harmonised to some extent, as are barriers impeding trade in services; and we model improved trade facilitation by reducing the time taken for goods to clear customs.

The outcomes of the TPP negotiations are currently not known; therefore, assumptions on the types and level of liberalisation that might be implemented need to be made in the two scenarios we model:

- Scenario A: Tariff reductions with some dairy TRQ expansion;
- Scenario B: Tariff reductions (Scenario A), plus reductions in barriers to services trade, reductions in NTBs for goods trade and improvements in trade facilitation;

Data on international tariff barriers are at a relatively advanced stage of development and the trade community has largely converged on a common set of data and methods for analysis, though we note that simplifying assumptions need to be made when modelling the TRQs applied to some agricultural exports.[4] In contrast to tariff barriers, international estimates of NTBs[5] on goods and services trade remain at a lower stage of development. No single NTB database or set of estimates of these barriers has garnered widespread support and use within the trade community. Indeed much of the current effort in modelling goods NTBs and services barriers is focused on improving the underlying data, along with improving estimation and modelling techniques. Many of the currently available measures of non-tariff barriers may be considered to be "first generation" estimates. Work is currently underway by a number of organisations to improve the data sources, estimates and modelling in this area.[6] The estimates we employ here are based on some of the best measures of these barriers which are currently publically available; while they can provide useful insights into the impacts of liberalisation in these areas of reform, we recommend that results from these be viewed with appropriate caution.

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[4] The detailed data defining TRQs applied to some agricultural exports are not able to be utilised in this study, particularly as many TRQs are defined beyond the HTS-6 digit level which would have required a large sectoral disaggregation. Our analysis follows the GTAP approach of modelling them as tariff equivalents. Some TRQs and tariffs in the TPP region are high enough to be nearly prohibitive, suggesting "water" in the tariffs, which means the rates of protection likely exceed that required to stop all but a small amount of trade (prohibitive tariffs), which could lead to an overestimation of impacts. However, these effects are ameliorated by the inclusion of sensitive products in the scenarios we present.

[5] Technically, a non-tariff measure (NTM) is any action which may restrict trade; some are legitimate measures to protect consumer health and safety and are usually applied equally to domestic and imported products. Non-tariff barriers (NTBs) are those which are targeted in a discriminatory manner at imports or exports and are not considered to have a legitimate purpose other than restricting trade. While the distinction is clear, practitioners often use the two terms interchangeably, without distinction. Data bases rarely distinguish the difference between the two, resulting in many non-tariff measures being declared barriers.

[6] This is clearly an important area and we expect significant improvements in future international estimates and modelling of NTBs. For example, the Organisation for Economic Co-operation and Development (OECD) is preparing a comprehensive service barriers database based on a systematic review of OECD countries. In goods trade, the World Bank and UNCTAD are leading efforts to improve information on NTBs in goods by conducting comprehensive reviews of key economies, many of which have not seen their data updated since 2001 (UNCTAD 2010). As part of this international effort to collect comprehensive data within a consistent framework (UNCTAD 2013), a new and highly detailed database of New Zealand's NTMs that may impact goods trade has recently been prepared by Mike Webb and Anna Strutt of the University of Waikato. This international project, led by UNCTAD and the World Bank, aims to provide a rich dataset that will support improved future work in the area of NTMs, including for New Zealand.

There are a number of areas of potential importance to the TPP that we do not model. For example, we do not explicitly address regional development priorities or the encouragement of small and medium business enterprises. Trade issues involving innovative products and services such as those related to the digital economy and green technologies, along with trade and environment challenges, are also not modelled. We do not model investment obligations or intellectual property (IP) provisions. The scope of the current report does not include modelling foreign direct investment (FDI) which might occur as a result of lowering barriers to FDI. Nor do we employ assumptions about how labour markets might expand with changes brought about by TPP, including due to the international movement of people (Poot and Strutt, 2010). To the extent that issues such as FDI or employment market assumptions might boost gains from trade agreements, our estimates may be viewed as understating some potential gains.

Global CGE models are powerful tools for policy analysis; however, as with any modelling work, a range of simplifying assumptions need to be made.[7] While any large-scale modelling effort such as this is subject to a range of limitations, we endeavour to be as transparent as possible about assumptions made.

Review of Existing Studies

Much has been written on the TPP, including on political, economic and strategic issues, but studies that attempt to quantify various aspects of the TPP are relatively few. We briefly review five quantitative studies.

Petri *et al.* (2011, 2012) analyse the TPP out to 2025 and provide the most comprehensive of the studies we review. The focus of their studies is on two emerging trade liberalisation tracks in the Asia-Pacific region: the TPP and an Asian track that envisages a free trade arrangement including among some smaller Asian economies. A 24-region, 18-sector (including services) dynamic CGE model based on the Global Trade Analysis Project (GTAP) database is developed. Their dynamic model differs from the standard GTAP model in that it incorporates possibilities for increasing varieties of goods and services and the shifting of resources among firms with heterogeneous productivity within each sector. As with our own approach, their baseline contains details of many completed trade agreements. In their initial study, Petri *et al.* (2011) use the 2007 version 8 pre-release GTAP database and assume that membership of Japan and South Korea would be implemented in 2020. Their scenarios incorporate tariff reductions, utilisation rates of tariff preferences, reduction of non-tariff barriers to trade in both goods and services, and costs associated with meeting rules of origin. They compare a TPP track and an Asian track that builds on Association of South East Asian Nations (ASEAN) integration efforts. Benefits and strategic incentives of these tracks are examined over the period 2010-2025. As expected, annual gains to the world economy increase as the scope of each agreement expands. They conclude that strong incentives would emerge for the United States of America and China to press for a consolidation of the two tracks into a region-wide agreement.

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[7] The use of CGE models, along with their strengths and limitations, has been widely discussed in the literature. For example, Piermartini and Teh (2005) provide an overview of the use of CGE models for trade policy analysis; studies such as Francois and Martin (2010) and the qualifications section of Anderson and Strutt (2015) provide discussion of some reasons CGE models may underestimate the full impacts of trade reform.

Petri *et al.* (2012) differs substantially from their earlier study, with the model introduced as an expanded version of their 2011 study. Their updated modelling incorporates foreign direct investment (FDI) effects, and liberalisation on the 'extensive margin' of trade—exports by companies not involved in international markets prior to liberalisation. In this later model, membership of Japan and South Korea is bought forward to 2015. These and other changes have increased estimated benefits when compared to their 2011 results, and at the global level, 33 per cent of income gains are due to FDI effects and 44 per cent are due to extensive margin trade effects. These authors updated their studies in 2013 by simulating other TPP configurations, including a 12-country grouping identical to that of the current study (Petri *et al.*, 2013). Given the ambitious modelling effort undertaken by Petri *et al.* it may be of interest to view a comparison of key differences between their study and ours, which we include in Appendix I.[8]

Areerat *et al.* (2012) use the static GTAP model and version 7 2004 database aggregated to 17 regions and 14 sectors. They examine consequences of an extension of their definition of TPP[9] to include Japan, South Korea and China. In all scenarios, tariffs are eliminated. When China and Korea are added separately to the TPP, each suffers a loss in welfare but the simultaneous addition of these countries plus Japan provides welfare gains to all the now ten TPP parties with the exception of Peru. Our own study improves on Areerat *et al.* (2012) in several ways, including modelling all current TPP partners, using a dynamic model with phasing in of agreements over time, careful modelling of potentially sensitive sectors and incorporating several key features of the negotiations in addition to tariff reductions.

Itakura and Lee (2012) examine alternative sequencing of free trade agreements, by comparing a gradually-enlarging TPP with two alternative East Asian agreements. As do we, they use the dynamic GTAP CGE model (GDyn) with projections out to 2030, but they use an older 2004 base data aggregated up to 22 regions and 29 sectors. A feature of their methodology is that tariff-equivalents of non-tariff barriers are estimated, though just for services. In their scenarios, tariffs are gradually cut to zero over the projection period, but non-tariff barriers to services trade are lowered by 25 per cent. A conclusion is that the TPP track would be an attractive option for most countries in the Asia-Pacific region.

Li and Whalley (2013) quantify how China's participation or otherwise in the TPP could affect that economy and other members. They model both tariffs and non-tariff barriers which they estimate using gravity models. They use a static 11 country CGE model with two goods (tradable and non-tradable) and two factors (labour and capital). Australia and New Zealand, Chile and Peru, and ASEAN participants are aggregated into single regions. Their scenarios eliminate all tariffs, and then either halve or totally eliminate non-tariff costs. They conclude that China suffers a minor loss if it does not participate in TPP, but gains considerably should it participate, as do most other members under that scenario. Perhaps the most interesting feature of this study is its inclusion of trade costs. However, our own methodology goes further, including dynamics, more disaggregated regions and sectors, some focus on services and consideration of sensitive trade issues.

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8 Petri *et al.* (2012) do not analyse a TPP12 agreement. Their TPP Track begins with a TPP9 agreement in 2013 and then adds Canada, Japan, Mexico and South Korea in 2014. The TPP-12 analysis appears in their online 2013 report (Petri *et al.*, 2013).

9 Australia, Chile, New Zealand, Peru, Singapore, USA and Vietnam.

Organisation of the Report

The report proceeds as follows: Section 2 briefly summarises the modelling framework, assumptions, baseline construction and policy scenarios modelled; further details of our modelling approach, along with supplementary data tables, are included in appendices for keen readers. In Section 3, we present results from our modelling, focusing on an overview of the potential impacts of TPP on New Zealand. Finally we offer some concluding comments in Section 4.

2. Modelling Framework and Scenarios

In this section we outline the modelling framework and databases employed, including briefly reviewing the construction of our baseline projection of the world economy to 2030, which is an important component of using a dynamic model. We then outline the trade liberalisation scenarios modelled. These sections are intentionally brief: further details on data sources and methodology are included in two appendices: Appendix IV - Baseline Development and Appendix V – Scenarios and Data Sources. Readers are encouraged to explore these resources for a deeper understanding of the modelling context and limitations.

Model and Database

The modelling framework used to analyse potential impacts of our TPP liberalisation scenarios is the Dynamic GTAP Model (GDyn), as documented in Ianchovichina and Walmsley (2012). The standard GTAP model is a well-known and widely used comparative static global CGE model that captures interactions between regions and sectors within a fully consistent framework (Hertel 1997). The model and supporting database are widely used for policy analysis: they are fully documented and publicly available, providing a relatively high degree of transparency.[10]

The GDyn model we use is a recursive dynamic version of the standard GTAP model that permits modelling and implementation of policy changes over time, as well as capital accumulation along with international mobility and foreign ownership of capital (Ianchovichina and McDougall, 2012). Other features of the standard GTAP model are retained, including: consumers maximise welfare subject to their budget limitations while firms maximise profits, within perfectly competitive markets with constant returns to scale and using the limited resources available in the economy.[11] Five primary factors of production (land, natural resources, physical capital, and unskilled and skilled labour) combine with intermediate inputs, both domestically produced and imported, to produce final output.[12] Elasticities specify the extent to which substitution is possible between imports from different sources and between imports and domestic production. When a policy change such as TPP liberalisation is simulated, prices and quantities of commodities, along with related impacts on total output, welfare and incomes are endogenously determined within the model.[13]

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[10] See www.gtap.agecon.purdue.edu for detailed information on the GTAP model and database.
[11] In contrast, some CGE models, such as those employed by Petri *et al.* (2011, 2012) assume monopolistic competition between producers.
[12] While skilled and unskilled labour supplies are assumed to change over time in the baseline, the macroeconomic closure we use in the policy scenarios assumes that labour is fully employed and fixed at the baseline labour supply level for each respective year.
[13] The model is solved with GEMPACK software (Harrison and Pearson 1996), using the RunDynam interface.

In the current study, we use the GDyn v8.1 database benchmarked to 2007.[14] The full database comprises 134 countries and regions, disaggregated into 57 sectors (Narayanan *et al.*, 2012). However, we aggregate the database to model 31 sectors and 21 countries or regions (Appendix Tables II and III),[15] further aggregating the sectors for reporting purposes.

We develop a baseline 'business as usual' projection from the 2007 benchmark year to 2030. To project the global baseline we use projections, including of growth in GDP, population, skilled and unskilled labour for each region in our aggregation, as detailed in Appendix IV, Table AIV.1. Projecting baseline growth and consequent changes in the global economy allows us to approximate the state of economies at the time they liberalise. An important aspect of building the baseline is the inclusion of key trade agreements already concluded by TPP partners. More than two dozen preferential trade agreements are included in the baseline, as detailed in Appendix IV Table AIV.2. Simulations that include TPP implementation are then compared with the baseline, allowing us to isolate the potential impacts of TPP.

We do not model changes in investment resulting from changes in investment laws or the removal of FDI barriers which might result from a TPP agreement. Our parsimonious approach to modelling investment by not including specification of barriers to investment acknowledges the dearth of global FDI data required to estimate the impacts of removing these barriers. Current efforts to model FDI in CGE models generally focus on representing "portfolios" of foreign investment by country and sector. These specifications require global bilateral data on foreign investment, capital stocks and asset ownership. These values may be econometrically estimated but this was beyond the scope of the current study. We take the GDyn approach to estimating investment endogenously, without more complex representation of FDI, recognising that while these effects are likely important, they are not well represented in the current state of mainstream policy research and modelling.[16]

Liberalisation Scenarios

Historically, negotiating a Free Trade Agreement (FTA) like the TPP focused on reducing or eliminating tariffs and expanding or eliminating quotas between prospective members. Further negotiations might be undertaken in areas which ranged from harmonising customs procedures and paper work to greater access for labour movement and foreign investors in members' markets, to mutual recognition of standards and technical barriers to trade and sanitary and phytosanitary regulation. However, discussions beyond tariff reductions were frequently not the main focus of negotiations.

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[14] We note this was the latest database available at the time of developing the current modelling framework. The v9 GTAP database is now available: it includes a benchmark year of 2011, updated input-output data for New Zealand (contributed by Anna Strutt and Papu Siamaja of the University of Waikato), improved specification of a number of other countries including Brunei and other innovations such as more detailed specification of labour markets. However, v9 of the GDyn database is not yet publicly available. Please see www.gtap.org for further details.

[15] Brunei is not available as a separate region in the GTAP v8.1 database (it is included in a region combined with Myanmar and Timor Leste). While more disaggregated databases are used to calculate liberalisation appropriate for Brunei's contribution to this group, we are not able to model Brunei separately.

[16] Walmsley *et al.* (2012) illustrate sensitivity analysis of investment parameters in the GDyn model which can be employed to "simulate" declining barriers to investment and reduced risks associated with better governance. However, this approach may be viewed as exploratory, since econometric estimates of the required parameters are not available.

As indicated in the introduction to this report, the TPP promises to be a "comprehensive and high-standard" next generation FTA which recognises that tariff barriers, while important, will only be a part of the negotiations that are also aimed at lowering barriers to services trade, non-tariff barriers in goods trade, intellectual property, and e-commerce among other issues.[17] Moreover, the TPP is envisioned to address the concerns of overlapping and often contrasting trade agreements which have proliferated in the Asia-Pacific region (United States (US) Congressional Research Service, 2013), with regulatory and policy coherence being goals of TPP negotiators.[18]

World wide data on tariffs have been developed as a result of decades of WTO negotiations and there exists considerable consensus around these data. In contrast, efforts to prepare data on barriers to trade in services and non-tariff barriers to trade in goods are still in the relatively early stages of development. We employ two leading databases of econometric estimates of these barriers, while recognising the relatively early stage of research and data in services and goods NTBs.[19]

Tariff negotiations take place in an environment of national policy and sectoral interests. For many countries, tariffs and TRQs are a part of industrial and agricultural policies with long legislative histories. These sensitivities are often recognised in the tariff negotiating process by providing flexibilities in reducing or eliminating tariffs. While we do not explicitly model individual TRQs,[20] our analysis incorporates a simplified approach to incorporating some of these nuances. We also recognise that, although the TPP is an ambitious agreement, tariff elimination in all sectors may not be achieved. Our tariff cutting formulas, therefore, are comprised of three main parameters: 1) the per cent of Harmonized Tariff Schedule (HTS)-6 tariff lines to have tariffs eliminated upon entry into force (EIF) of the agreement; 2) the number of tariff lines to be phased to zero within 10 or 15 years; 3) the number of tariff lines exempt from tariff cutting. We further stratify the TPP negotiating parties into three groups, recognising that certain countries have a history of lowering tariffs rapidly, here listed as Group A including New Zealand, Australia, Chile, Singapore and Brunei. The large developed economies, Canada, Japan and the United States are included in Group B. Finally, Group C includes Mexico, Peru, Malaysia and Vietnam, recognising TPP members' commitments to provide flexibilities for developing country members. Our principal distinctions provided to the developing countries are a longer, 15 year phase out of tariffs and a less ambitious goal for lowering tariffs when the agreement enters into force.

Sensitive products are those either exempt from tariff reduction or those provided partial, though not free, access. Following Jean *et al.* (2008), we define exempt products by a tariff revenue formula for each TPP member, in which products projected to result in the greatest tariff revenue changes are ranked most highly as sensitive. We further adapt this formula to account for the politically sensitive nature of agricultural TRQs in the large developed economies of Canada, Japan and the United States, by

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[17] Leaders from the TPP countries at the 2011 APEC meeting in Honolulu agreed to negotiate "a comprehensive, next-generation regional agreement that liberalises trade and investment and addresses new and traditional trade issues and 21st century challenges." United States Trade Representative www.ustr.gov/about-us/press-office/fact-sheets/2011/november/outlines-trans-pacific-partnership-agreement. Though, as mentioned earlier, we do not attempt to model all of these issues.

[18] Harmonising rules of origin between the often overlapping TPP agreements is an example of the effort needed to improve regulatory coherence.

[19] Our data sources and compilations are reviewed in Appendix V of this report.

[20] As mentioned earlier, full and accurate modelling of TRQs poses significant data challenges that are well beyond the scope of the current project.

recognising these products are likely to be the first to be excluded from tariff reductions (see Appendix VII). In the case of other countries, both manufactures and agricultural imports are ranked without distinction when defining sensitive products.

MFAT requested results for the two liberalisation scenarios detailed in Table 2.1. In both scenarios, we assume 2015 is the initial year of implementation. Scenario A includes tariff liberalisation, with up to 0.5 per cent of HTS-6 tariff lines categorised as sensitive and not liberalised. However, for beef and sheep, we assume that sensitive product tariffs are reduced by 80 per cent, while for dairy we include full removal of tariffs by Vietnam and Malaysia. For dairy imports to Canada, Japan and the United States, we follow a different approach, estimating partial liberalisation of dairy quotas by including an expansion of in-quota trade by ten per cent, but maintaining the out-quota tariff rate restrictions for these products.[21]

In Scenario B, we model the impact of broader trade liberalisation in combination with the tariff liberalisation and dairy quota expansion of Scenario A. In particular, we include reductions to services trade barriers, reductions to NTBs in goods trade and also improved trade facilitation, as summarised in Table 2.1. The aim of this scenario is to explore potential gains from reducing and harmonising these barriers, along with tariff reductions, by employing the best available "first generation" estimates of their trade restrictiveness.[22] All services barrier reductions, reductions to NTBs in goods trade and also trade facilitation measures are assumed to be implemented in equal stages over the first five years of the agreement.

Column 2 of Table 2.2 shows projections of average tariffs and tariff equivalents of TRQs and specific rates of duties imposed on New Zealand by TPP countries in 2030. These projections include estimated reductions required by existing trade agreements (Table AIV.2). The projected trade weighted average rate of tariffs and TRQ protection that New Zealand faces in 2030 is relatively low at 3.1 per cent. However, there remain relatively high average tariffs on products such as dairy, and beef and sheep meat that New Zealand currently exports to TPP agricultural markets. Column 3 indicates the projected level of protection after the TPP agreement modelled is phased in. Though most tariffs and duties are projected to be eliminated and are zero or close to zero, the inclusion of sensitive products is evident in sectors where some tariffs and the tariff equivalent of TRQs are projected to remain. Under the TPP liberalisation modelled, we project the trade weighted average tariffs faced by New Zealand to reduce to 1.7 per cent.

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[21] The quota expansion is accommodated in our modelling by allowing the tariff equivalent of the quota to reduce sufficiently to expand exports by the required 10 per cent, with the increase implemented evenly between 2015 and 2030.

[22] The reduction of NTBs and services barriers are modelled in a similar manner to that outlined by Fugazza and Maur (2008), as a change in import preferences in an amount equivalent to the quantity of imports which would occur if tariffs were changed by an amount equivalent to the estimated trade restrictiveness of the NTB. This method maintains the advantage that it does not change government tariff revenues while achieving similar changes in trade implied by the "tariff equivalent" of NTBs. In doing so, we make no assumptions about the allocation of rents between agents in the model. While liberalisation of services and NTBs may result in changes to productivity, we do not model these types of effects. We also do not model any costs that may be incurred as a result of reducing NTBs.

Table 2.1
Scenarios for a TPP agreement with 12 members

Scenario	Tariffs				NTBs	Services	Trade facilitation
	Sensitive (per cent HS lines free)	Additional sectoral liberalisation	EIF (2015)	Years to implement			
Scenario A	A—0.0% B—0.5% C—0.5%	Beef & sheep: 80% reduction in sensitive tariff lines Dairy: 10% dairy quota expansion in Japan, USA and Canada; full tariff removal by Vietnam and Malaysia	A—90% B—75% C—65%	A—10 B—10 C—15	--	--	--
Scenario B	As for Scenario A				Reduction to mean of the TPP region	Reduction to mean of the TPP region	25 per cent reduction in customs clearance time

Note: Group A – New Zealand, Australia, Chile, Singapore and Brunei; Group B – Canada, Japan, and the United States; Group C – Mexico, Peru, Malaysia, Vietnam.

Source: Authors' assumptions, incorporating input from MFAT.

Table 2.2
Trade-weighted average tariff equivalents faced by New Zealand for exports to all TPP markets, baseline and TPP Scenario A, 2030 (per cent)

Column 1 Aggregated sectors	Column 2 2030 Base	Column 3 2030 Scenario A
Fruit & vegetables	2.8	0.0
All other crops	0.9	0.0
Live animals	1.6	0.0
Wool	1.5	0.0
Beef & sheep meat	8.4	1.6
Other meats	4.7	0.1
Dairy & milk	12.8	9.3
Other food	3.5	2.0
Natural resource	0.7	0.0
Extractive industries	0.2	0.0
Light manufactures	1.4	0.0
Other manufactures	0.6	0.1
All exports	3.1	1.7

Source: Authors' GDyn model results.

3. Potential Impacts of TPP on New Zealand

In this section, we present results for the two scenarios modelled (see Table 2.1 for full details):

- Scenario A: TPP tariff liberalisation, generally assuming half a per cent of HTS-6 tariff lines are sensitive and not liberalised, but that there is an 80 per cent reduction of sensitive tariffs in the beef and sheep sector, full removal of dairy tariffs by Vietnam and Malaysia and a ten per cent expansion of dairy exports to markets covered by TRQs in Canada, the US and Japan;
- Scenario B: Tariff reductions and quota expansion from Scenario A, plus reductions in barriers to services trade and reductions in NTBs for goods trade to the mean of the TPP region, along with improved trade facilitation.

Overall Economic Impacts of the TPP Liberalisation Scenarios

We first explore the potential impacts of the TPP liberalisation scenarios on real gross domestic product (GDP), economic welfare and total real trade flows for New Zealand. It is important to note that the TPP and other economies will evolve over the baseline projection to 2030, even in the absence of TPP liberalisation (see Appendix IV). Therefore, we analyse the results of liberalisation relative to our 'business as usual' 2030 projected baseline which does not include the TPP agreement. We generally focus on reporting cumulative percentage changes due to TPP liberalisation for 2030, by which time full implementation of the scenarios modelled will have occurred.

Throughout this report, no adjustments are made to reflect the present value of future benefits; readers are cautioned to note that benefits received in the future may be valued differently to present consumption. Appropriate social discount factors could be applied within a social discounting framework to rescale net benefits received in the future to present day values. However, such calculations are not within the scope of this report.

ECONOMIC WELFARE IMPACTS

Policy changes impact economic welfare and the GDyn model provides a summary measure of welfare changes for a country.[23] Aggregate welfare results, as measured by equivalent variation, are positive

[23] This measure is equivalent variation (EV), a commonly used dollar value indicator of changes in economic welfare. EV is defined as the addition or subtraction of income one would have to undertake, at the base level of prices, to obtain the same level of welfare after the proposed policy or regulation is implemented. Welfare results can provide a comprehensive measure of policy impacts: along with changes in allocative efficiency, endowments and technology,

for New Zealand for the scenarios modelled, as shown in Table 3.1. In 2030, the welfare increase is projected be US$371 million for Scenario A and US$1.8 billion for Scenario B, expressed in constant 2007 dollars (Table 3.1). These total welfare effects comprise a range of components, including: changes in allocative efficiency as resources move to more or less efficient uses; changes in the terms of trade as a country's export prices change relative to import prices; changes in returns to ownership of capital; and also growth in endowments, technological change and efficiency improvements (Walmsley *et al.* 2012a).

Table 3.1

Economic welfare effects of TPP on New Zealand in 2030, Scenarios A and B

	Scenario A	Scenario B
	Tariff cuts plus 10% dairy quota expansion	Scenario A plus NTBs and trade facilitation
Constant 2007 US$ million	371	1,805
Constant 2007 NZ$ million*	504	2,452

Note: Changes in welfare are measured relative to baseline for the year 2030 in constant 2007 prices.

**Converted applying 2007 exchange rate of 0.7361 (calculated using a simple average of series B1 monthly exchange rates from the Reserve Bank of New Zealand).*

Source: Authors' GDyn model results.

REAL GDP IMPACTS

The cumulative projected increases in New Zealand's real GDP for 2030, due to the TPP liberalisations modelled, are summarised in Table 3.2. Results for Scenario A indicate that by 2030, tariff liberalisation alone may lead to New Zealand's real GDP being 0.21 per cent higher than in the baseline. Given that tariff levels between New Zealand and other TPP countries are already relatively low on average for many goods (Table 2.2), it is not surprising that tariff reductions alone lead to relatively modest percentage increases in real GDP. When we also include liberalisation of NTBs in goods and services trade, along with reductions in customs delays, our projections suggest that the real GDP increase for New Zealand could be 1.42 per cent in Scenario B. Given that New Zealand's real GDP is projected to expand by 2030, these percentage increases will be from a larger baseline economy than New Zealand currently has. For Scenario A, the dollar equivalent of the 2030 increase in real GDP is approximately US$460 million, expanding to US$3.1 billion in Scenario B, expressed in constant 2007 dollars (Table 3.2). Table 3.2 also converts these US dollar values to New Zealand dollars for convenience.

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they include changes in ownership of capital and in the terms of trade. Terms of trade measure the price of exports relative to the price of imports, with improvements in the terms of trade enabling a country to purchase more imports for any given level of exports. For detailed discussion of welfare analysis in GTAP, see Huff and Hertel (2000); for applying welfare analysis within the GDyn framework, see Walmsley *et al.* (2012a).

Table 3.2
Effects on New Zealand's real GDP, TPP Scenarios A and B, cumulative change relative to the 2030 baseline

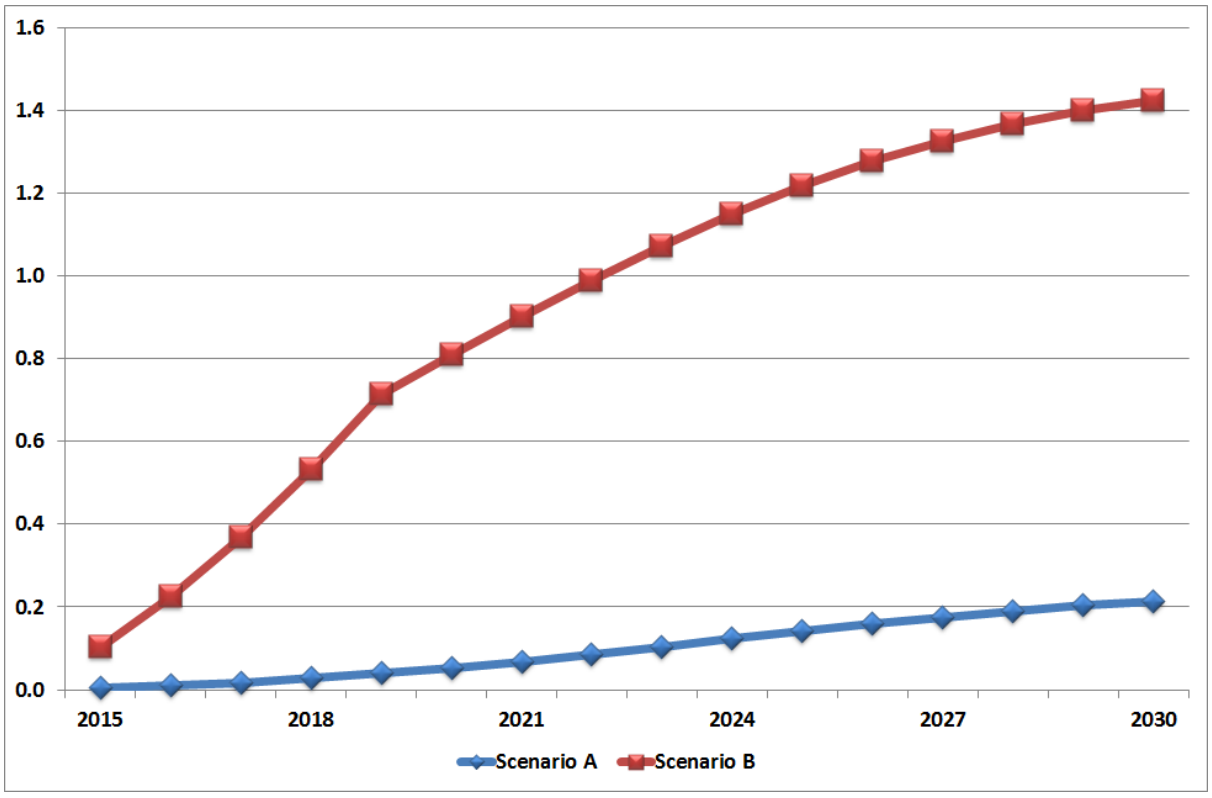
	Scenario A	Scenario B
	Tariff cuts plus 10% dairy quota expansion	Scenario A plus NTBs and trade facilitation
Per cent	0.21	1.42
Constant 2007 US$ million	459	3,062
Constant 2007 NZ$ million*	624	4,160

*Converted applying 2007 exchange rate of 0.7361 (calculated using a simple average of series B1 monthly exchange rates from the Reserve Bank of New Zealand).

Source: Authors' GDyn model results.

Figure 3.1 illustrates projected changes in New Zealand's real GDP from 2015 to 2030, with implementation of scenarios A and B. The cumulative annual impacts on New Zealand's real GDP grow each year as the TPP agreement is implemented, leading to the 0.21 per cent increase relative to baseline GDP for 2030 in Scenario A and 1.42 per cent for Scenario B. As shown, the inclusion of reductions to NTBs in goods and services trade in Scenario B has a significant impact on real GDP results.

Figure 3.1
Impact on New Zealand's real GDP, TPP Scenarios A and B, 2015-2030 (cumulative per cent differences from baseline)



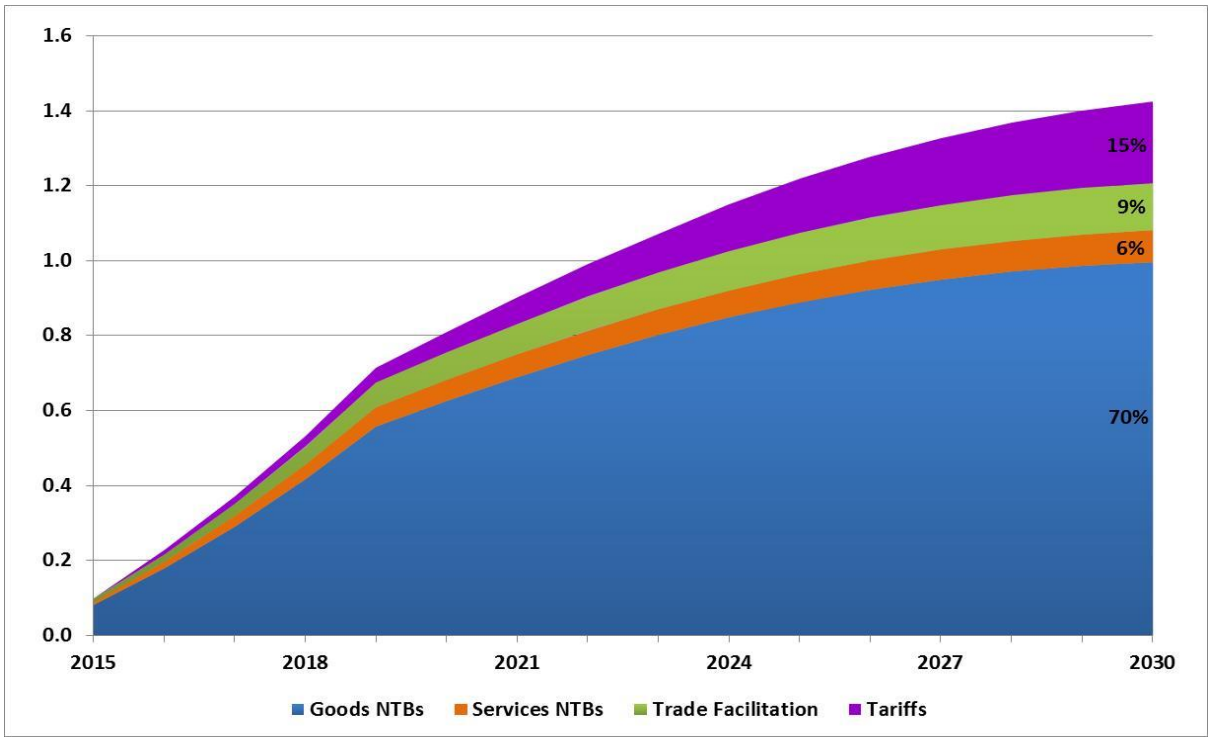
Source: Authors' GDyn model results.

DECOMPOSITION OF REAL GDP GROWTH

Scenario B includes multiple interacting components: in addition to the tariff reductions from Scenario A, it includes services trade liberalisation, goods NTB liberalisation and trade facilitation improvements, all implemented over the five year period from 2015. Each component of the scenario contributes to the overall results. Figure 3.2 decomposes the impact of each component of the Scenario B liberalisation to show the relative contribution of each to real GDP growth between 2015 and 2030. The impact of reductions in goods NTBs contributes an estimated 70 per cent to the 2030 real GDP result, while tariff reductions contribute approximately 15 per cent of the 2030 GDP impact in Scenario B.

Figure 3.2

Decomposition of New Zealand's real GDP growth, TPP Scenario B relative to the baseline (per cent contribution of each component indicated for 2030, cumulative per cent increase in total GDP on vertical axis)



Source: Authors' GDyn model results.

INTERNATIONAL TRADE IMPACTS

Table 3.3 indicates the cumulative projected percentage changes in New Zealand's real exports and imports. In scenario A, New Zealand's real exports expand by 0.4 per cent relative to the 2030 baseline. When non-tariff barriers to trade are also liberalised in Scenario B, the overall expansion of real exports is 2.2 per cent, relative to the 2030 baseline. Increases in imports to New Zealand are of similar magnitude.

Table 3.3
Projected impact on New Zealand's overall real exports and real imports, 2030, TPP scenarios A and B (cumulative per cent differences from baseline)

	Scenario A	Scenario B
	Tariff cuts plus 10% dairy quota expansion	Scenario A plus NTBs and trade facilitation
Real exports	0.4	2.2
Real imports	0.9	2.5

Source: Authors' GDyn model results.

Sectoral Impacts

The scenarios we model involve different degrees of liberalisation; therefore, sectoral impacts will vary, driven in part by the extent of the liberalisation in that sector (see Table 2.2, along with appendix tables AV.3, AV.4 and AV.5). Table 3.4 indicates the expected changes in real exports and real output by aggregated sector for the scenarios modelled. While real exports rise in aggregate for New Zealand, there are important differences between sectors, with sectoral results incorporating the general equilibrium impacts of resources moving between sectors in response to changes in relative prices that result from the liberalisation undertaken.

The changes in export volumes reported in Table 3.4 tend to be reflected in changes in New Zealand's real output. Most sectors, including meats, processed foods and beverages, and light manufactures, experience increases in real output and real exports under both scenarios relative to the 2030 baseline. The same applies to dairy, though the increases are less than for some other agri-food sectors, in part because the liberalisation is relatively limited for this sector (see Table 2.2). When we reduce NTBs to goods and services trade in Scenario B (see appendix tables AV.3, AV.4 and AV.5), the magnitude of output expansion tends to be higher for non-agricultural sectors and also for some agri-food sectors than in the tariff-only scenarios (Table 3.4). Please note that a negative number in Table 3.4 indicates a contraction relative to the 2030 projected baseline, not a contraction compared to present levels.

Table 3.4

Changes in New Zealand's real exports and real output by sector, TPP scenarios A and B, 2030 (cumulative per cent differences from baseline)

	Real Exports		Real Output	
	Scenario A	Scenario B	Scenario A	Scenario B
	Tariff cuts plus 10% dairy quota expansion	Scenario A plus NTBs and trade facilitation	Tariff cuts plus 10% dairy quota expansion	Scenario A plus NTBs and trade facilitation
Fruit & vegetables	-0.2	-0.4	0.1	0.2
All other crops	-1.5	0.3	-0.5	0.0
Live animals	0.3	1.0	1.1	1.2
Wool	-3.4	-6.4	-1.7	-3.2
Beef & sheep meat	1.9	1.2	1.4	1.0
Other meats	8.3	11.9	2.5	3.7
Dairy & milk	0.5	0.9	0.4	0.8
Other food	1.4	4.8	0.5	1.6
Natural resource	0.1	1.1	0.1	0.9
Extractive industries	0.0	4.4	0.0	0.4
Light manufactures	2.2	2.9	0.4	1.0
Other manufactures	0.4	3.6	-0.1	0.4
Services	-0.7	1.3	0.2	1.2

Source: Authors' GDyn model results.

4. Conclusions

Since the outcomes of the TPP negotiations are currently not known, assumptions on the type and level of trade liberalisation that might be implemented need to be made. In this context, the current study considers the impacts of two alternative TPP liberalisation scenarios, using a dynamic global general equilibrium model.

Reductions in tariff barriers are modelled using detailed data on tariffs, though we note that simplifying assumptions needed to be made in the modelling of TRQs applied to some agricultural exports. Our approach accounts for tariff reductions already committed to in other agreements, which are included in the baseline; thus the results of these are not attributed to TPP liberalisation. We also pay careful attention to identifying sensitive sectors that may be excluded from any tariff liberalisation. While reductions in NTBs appear likely to contribute significantly to the benefits from trade liberalisation, in contrast to tariff barriers, international estimates of non-tariff barriers to goods and services trade remain at a lower stage of development. Caution needs to be used when assessing results using currently available modelling techniques and measures of these trade restrictions; therefore, we are careful to separate out the impacts of reform in these areas.

Our modelling indicates that the TPP trade liberalisation modelled is likely to offer overall gains for the New Zealand economy, particularly if significant benefits can be achieved from the implementation of reductions in NTBs to trade. The aggregate change in economic welfare, as measured by equivalent variation and expressed in constant 2007 dollars, is projected to increase for New Zealand in 2030 by US$371 million in the tariff-only Scenario A and by US$1.8 billion in Scenario B that includes reductions in NTBs.

New Zealand's real GDP in 2030 is projected to increase by a cumulative 0.21 per cent relative to the baseline in the tariff-only Scenario A. Given that average tariff levels between New Zealand and other TPP countries are already relatively low on average, it is perhaps not surprising that tariff reductions lead to relatively modest percentage increases in real GDP. However, we find that reductions in NTBs to services and goods trade have the potential to significantly expand overall gains from a TPP agreement. When we include liberalisation of NTBs in goods and services trade, our cumulative results for Scenario B suggest there could be a 1.42 per cent increase in real GDP in 2030.

Sectoral results reflect the general equilibrium impacts of resources moving between sectors in response to changes in relative prices that result from the liberalisation modelled. Most sectors, including meats, processed foods and beverages, and light manufactures, experience increases in real output and real exports under both scenarios relative to the 2030 baseline. The same applies to dairy, though the increases are less than for some other agri-food sectors.

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Appendix I-Comparison of Model Results with Petri *et al. (2011, 2012, 2013)*

While our model structure, liberalisation experiments and data are different from those used by Petri *et al.* (2011, 2012, 2013) a comparison with the outcomes of these models may be of interest. Some of the more important features of the Petri *et al*. models are discussed in the review of existing studies to be found in Section 1. They are summarised in Table AI.1, along with those of this study's approach (see Section2). Scenario B of our study is used to compare with the Petri *et al.* results, as it comes closest in terms of the set of parameters represented in the policy simulations. Note that in the first of these, Petri *et al*. (2011) do not model a 12-country TPP.

Table AI.1

Comparison of New Zealand study with Petri et al. studies

Item	Current New Zealand study	Petri *et al.* (2011)	Petri *et al.* (2012, 2013)[24]
Model features	Dynamic	Dynamic	Dynamic
	Perfect competition	Monopolistic competition	Monopolistic competition
			Entry of new exporting firms
			FDI side model
Data	GDyn V8.1 database (2007)	GTAP pre-release V8 database (2007)	GTAP pre-release V8 database (2007)
Data aggregation	31 sectors, 21 regions	18 sectors, 24 regions	18 sectors, 24 regions
Projection period	To 2030	To 2025	To 2025
TPP membership	TPP-12	TPP-12 + South Korea	TPP-12
Policy shocks	*Scenario B:*	*TPP track:*	
	Tariffs on goods	Tariffs on goods	Tariffs on goods
	Non-tariff barriers to goods and services	Utilisation rates of tariff preferences	Utilisation rates of tariff preferences
	Trade facilitation	Non-tariff barriers to goods and services	Non-tariff barriers to goods and services
	Dairy quotas to Japan, Canada & US expanded 10 per cent	Rules of origin costs	Rules of origin costs
			Barriers to foreign direct investment
Simulated economic welfare gains to New Zealand	US$1.8 billion (by 2030)	US$1.7 billion (by 2025)	US$4.1 billion (by 2025)

Source: Authors' comparisons.

The estimate of economic welfare gains are for 2025 in the Petri *et al*. studies as that was the end-point of their projection period. For the results from the present study, the table gives our result for 2030 since our tariff liberalisation was not fully implemented until then. Our economic welfare result for New Zealand is

[24] Petri et al (2012) gives details of the model, but the TPP-12 simulation was constructed and reported online in 2013.

rather similar to that of Petri *et al.* (2011) but differs from that in their 2012 study, in which they include additional model features.

Appendix II-Sector Aggregation

No.	Code	Description	GTAP sectors	Aggregated for reporting
1	Rice	Rice (paddy and processed)	PDR, PCR	All other crops
2	Fruit_Veg	Vegetables, fruit, nuts	V_F	Fruit & vegetables
3	Sugar	Sugar (raw and processed)	C_B, SGR	Other food
4	OtherCrops	Other crops: wheat, other grains, oilseeds, plant fibres etc.	WHT, GRO, OSD, PFB, OCR	All other crops
5	RawMilk	Raw milk	RMK	Dairy & milk
6	Cattle_sheep	Cattle, sheep, goats, horses etc.	CTL	Live animals
7	OtherAnimal	Pigs, poultry etc.	OAP	Live animals
8	Wool	Wool, silk etc.	WOL	Wool
9	Beef_Sheep	Beef and sheep meat	CMT	Beef & sheep
10	OtherMeats	Other meat: pork, chicken etc.	OMT	Other meats
11	Dairy	Dairy products	MIL	Dairy & milk
12	ProcFoods	Vegetable oils, other processed foods	VOL, OFD	Other food
13	Bev_Tob	Beverages and tobacco products	B_T	Other food
14	ForWoodPaper	Forestry, wood and paper products	FRS, LUM, PPP	Natural resource
15	Fisheries	Fisheries	FSH	Natural resource
16	Extractive	Extract of coal, oil, gas & other minerals; petroleum & coke	COA, OIL, GAS, OMN ,P_C	Extractive industries
17	Textiles	Textiles	TEX	Light manufactures
18	ApparelLea	Wearing apparel and leather products	WAP, LEA	Light manufactures
19	MotorVehicle	Motor vehicles & parts	MVH	Other manufactures
20	Electronics	Electronic equipment	ELE	Other manufactures
21	OthMachinery	Other machinery and equipment	OME	Other manufactures
22	OthManuf	Manufactures nes: metal prods, transport equip & other	FMP, OTN, OMF	Other manufactures
23	ChemRubPl	Chemicals, rubber and plastic products	CRP	Other manufactures
24	MineralProds	Non-metallic mineral prods: cement, plaster, concrete etc	NMM	Extractive industries
25	MetalProds	Iron & steel and non-ferrous metals	I_S, NFM	Other manufactures
26	Construction	Construction	CNS	Services
27	ObsInsFinSvs	Business, insurance and financial services	OBS, OFI, ISR	Services
28	AirOthTrn	Air and other transport	ATP, WTP, OTP	Services
29	TrdCom	Trade and communications	TRD, CMN	Services
30	GovSvs	Government services	OSG	Services
31	OthSvs	Other services	ELY, GDT, WTR, ROS, DWE	Services

[a] *See www.gtap.agecon.purdue.edu/databases/contribute/detailedsector.asp for details of the 57 GTAP sectors.*

Appendix III-Regional Aggregation

No.	Code	Description	Original GTAP regions
1	New Zealand	New Zealand	NZL
2	Australia	Australia	AUS
3	Chile	Chile	CHL
4	Canada	Canada	CAN
5	Japan	Japan	JPN
6	Malaysia	Malaysia	MSY
7	Mexico	Mexico	MEX
8	Peru	Peru	PER
9	Singapore	Singapore	SGP
10	USA	United States	USA
11	Vietnam	Vietnam	VNM
12	BruMyaTim	Brunei, Myanmar, Timor	XSE
13	RestASEAN	Other ASEAN countries	KHM, IDN, LAO, PHL, THA
14	China	China	CHN
15	HongKong	Hong Kong	HKG
16	Taiwan	Taiwan	TWN
17	Korea	South Korea	KOR
18	SthAsia	South Asia	IND, BGD, NPL, PAK, LKA, XSA,
19	WEurope	Western Europe: EU28 and EFTA	AUT, BEL, CYP, CZE, DNK, EST, FIN, FRA, DEU, GRC, HUN, IRL, ITA, LVA, LTU, LUX, MLT, NLD, POL, PRT, SVK, SVN, ESP, SWE, GBR, CHE, NOR, XEF, BGR, ROU
20	RestCLAmer	Rest of Central & Latin America	BRA, ARG, XNA, BOL, COL, ECU, PRY, URY, VEN, XSM, CRI, GTM, HND, NIC, PAN, SLV, XCA, XCB
21	RestofWorld	Rest of the World	XOC, MNG, XEA, ALB, BLR, RUS, UKR, XEE, XER, HRV, KAZ, KGZ, XSU, ARM, AZE, GEO, TUR, BHR, IRN, ISR, KWT, OMN, QAT, SAU, ARE, XWS, EGY, MAR, TUN, XNF, BEN, BFA, CMR, CIV, GHA, GIN, NGA, SEN, TGO, XWF, XCF, XAC, ETH, KEN, MDG, MWI, MUS,MOZ, RWA, TZA, UGA, ZMB, ZWE, XEC, BWA, NAM, ZAF, XSC, XTW

[a] *See www.gtap.agecon.purdue.edu/databases/regions.asp?Version=8.211 for the GTAP countries and regions (NB the GTAP website lists 129 regions in version 8, but there are 134 regions in version 8.1.)*

Appendix IV-Baseline Development

In this supporting appendix, we outline our assumptions for developing the baseline projections of the world economy through 2030. As noted in the report, simulations and the related impacts are calculated relative to the baseline projections to capture the world as it might appear when TPP policies are implemented.

Macroeconomic and Population Estimates

Table AI.1 presents an overview or our macroeconomic assumptions and estimates. Real GDP and population growth are historical rates from 2007-2012 (World Bank 2014). For projections beyond 2012, GDP growth rates are drawn from international estimates (World Bank 2014a; OECD 2014; and Fouré *et al.* 2010 and 2012); population growth rates, along with skilled and unskilled labour growth rates are based on CEPII estimates compiled by Chappuis and Walmsley (2011). Following Anderson and Strutt (2014), agricultural land growth rates are exogenously imposed, based on historical rates where possible for 2007-2011 then projected for the period to 2030 based on time-series growth rates from recent decades (FAO 2014).[25]

While total factor productivity is endogenous, we assume some sectoral differentials; in particular, we follow Anderson and Strutt (2014) in assuming that relative prices for primary sectors remain relatively flat over the projected period, with annual total factor productivity (TFP) growth rates assumed to be one per cent higher for agriculture, 1.5 per cent higher for fisheries and two per cent higher for extractive sectors relative to economy-wide growth. These assumptions are supported by other research, including Martin and Mitra (2001), who find that total factor productivity growth in primary sectors is higher than other sectors. In projecting to 2030, we acknowledge that income elasticities, particularly for key food crops in rapidly developing economies, are likely to reduce significantly as incomes grow. Therefore we draw on estimates of the relationship between per capita incomes and income elasticities of demand for food crops (Anderson and Strutt, 2014). Downward income elasticities adjustments are made for rice and other crops, while we increase the income elasticity of dairy products for China.[26]

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[25] We use time series data from 1990-2011, or in some cases 2000-2011 when these data appeared to provide better quality indicators of likely future land growth. The FAO agricultural land database series has a significant break for New Zealand between 2001 and 2002 when the FAO changed from 'manual estimation' to 'from official documents', and then from 2004 to 'official data'. Therefore in the case of New Zealand, our future land growth estimates are based on data from 2007-11.

[26] Anderson and Strutt (2014), with research assistance from Papu Siameja, draw on the full GTAP v8 2007 database and the log of 2007 per capita incomes, to estimate the income elasticities of demand for crops implicit in the GTAP database. The implied percentage changes in income elasticities, given projected changes in per capita income for each country between 2007 and 2030, are then used to reduce the income elasticity for each country for our projection to 2030. In particular we modify the target income elasticities for the key food crops where there are significant declines in income elasticities expected with income growth: rice and other crops in our current aggregation. Dairy income elasticities for China are set equal to the current level for Hong Kong.

Table AIV.1
Average annual macroeconomic assumptions in baseline, 2013 to 2030 (per cent)

	Real GDP	Population	Unskilled labour	Skilled labour	Land
New Zealand	2.30	0.71	0.11	1.40	-0.25
Australia	2.17	0.87	-0.05	1.59	-0.60
Chile	3.05	0.70	0.48	2.67	-0.03
Canada	2.10	0.83	0.14	0.96	-0.38
Japan	1.15	-0.21	-1.45	0.61	-1.05
Malaysia	4.42	1.14	0.31	4.04	-0.02
Mexico	3.17	0.64	0.58	2.84	-0.03
Peru	3.81	0.99	0.74	3.34	-0.07
Singapore	2.35	0.53	-2.42	2.21	0.00
US	2.17	0.75	-0.04	1.58	-0.07
Vietnam	4.75	0.86	0.62	3.70	1.94
Brunei group	4.60	0.87	0.41	3.68	0.00
Other ASEAN	5.12	0.85	0.67	3.36	0.68
China	7.45	0.36	-0.24	2.45	-0.10
Hong Kong	1.95	0.72	-0.53	1.02	0.00
Taiwan	4.62	0.29	-0.47	1.87	0.00
Korea	2.06	0.04	-0.95	1.96	-1.02
South Asia	6.58	1.08	1.29	3.91	-0.02
Western Europe	1.39	0.07	-1.44	1.15	-0.42
Other C&L America	3.24	0.77	0.49	3.11	0.40
Rest of World	3.98	1.42	1.51	3.27	0.11

Sources: World Bank (2014 and 2014a); OECD (2014); Fouré et al. (2010 and 2012); Chappuis and Walmsley (2011); Anderson and Strutt (2014); FAO 2014). See text of Appendix IV for details.

Key Trade Agreements and Tariffs Incorporated into Baseline

Our trade and tariff data are based on the same 2007 benchmark year as the GTAP database and are from United Nations (UN) reporting agencies. For two key economies in our model, the United States and New Zealand, we update the UN database with more recent customs data on trade and tariffs. For the United States, we incorporate official United States Department of Commerce Census data on duties paid and trade shares for 2011. In the case of New Zealand, we incorporate 2013 tariffs as reported by the New Zealand Ministry of Foreign Affairs and Trade.[27]

[27] Neither of these databases includes unit values or *ad valorem* equivalents of specific rates. Therefore, we identify specific rates and TRQs in these databases and carry forward the estimates from the UN data in these cases. In the case of the US, numerous AVEs were carried forward. In the case of New Zealand, only an AVE on used clothing was carried and several tariff rates in the UN file were corrected, especially in the motor vehicle sector.

A number of significant existing trade agreements to reduce tariffs are being implemented over the baseline period that we model from 2007 to 2030; therefore, to isolate the impacts of a TPP agreement we need to include implementation of these agreements in our baseline. Ignoring these would likely overstate the gains from TPP, with the risk that liberalisation commitments already achieved through other agreements could be incorrectly attributed to TPP. While it is not possible to fully model all trade agreements, we model implementation of key agreements involving TPP countries (Appendix VI). Since these baseline trade agreements are not the primary focus of the current study, relatively simple rules are used to model them, as summarised in Table AIV.2.

Table AIV.2

Trade agreements incorporated into baseline projections

Agreement	Entry into force	Full implementation	Sensitive products (per cent tariff lines as exclusions)	Notes
AGREEMENTS WITH CUSTOMISED PHASE-OUT AND SENSITIVE PRODUCTS				
North American Free Trade Agreement	1993	2007	Dairy (US-Canada)	Sugar side agreements. Mexico corn and orange juice and kidney beans in dispute.
AUS-USA	2005	2023	USA-sugar, dairy, avocados, peanuts sugar, beef; AUS-Sugar – TRQs remain with lower (zero) in quota rates.	
USA-CHL	2004	2016	None.	Beef over 4 years; poultry over 10 years; Chile-dairy 4 – 8 years; TRQs on wheat, flour and sugar will remain in effect for 12 years.
USA-SNG	2004	2013	None-rules of origin apply.	Many products imported into the US from SGN carry duty due to origin requirements
ASEAN	1993 (Singapore, Malaysia, Indonesia, Brunei, Philippines, Thailand); Vietnam 1995; Laos, Myanmar 1997; Cambodia 1999	2010 (ASEAN6)/2015-8 (CLMV)	5%	CLMV derogations
Trans-Pacific Strategic Economic Partnership TPSEP	2006	New Zealand-2015; Chile-2017; Brunei-2015; Singapore –immediate.	New Zealand Zero %; Chile Zero%; Brunei Zero (except alcohol tobacco firearms)%; SGN Zero%[28]	
ASEAN-AUS-NZL	2010	2020	~1%	
MLY-NZL	2010	2016	Zero % New Zealand tariff lines by 2016; 0.5% of Malaysia imports from New Zealand by 2016[29]	

[28] From "The New Zealand – Singapore- Chile Brunei Darussalam Trans-Pacific Strategic Economic Partnership" New Zealand Ministry of Foreign Affairs and Trade.
[29] From "The New Zealand-Malaysia Free Trade Agreement" New Zealand Ministry of Foreign Affairs and Trade.

Agreement	Entry into force	Full implementation	Sensitive products (per cent tariff lines as exclusions)	Notes
AUS-NZL	1983	Fully in force	None	No duties in the MM database
NZL-SNG	2001	TBD	New Zealand-zero%; SGN Zero%.	No duties in the MM database
CHN-NZL	2008 (October)	New Zealand 2016; China- 2012 except—Milk and cream 2019, meat and certain fruit and processed fruit 2016.	New Zealand none. China exempt sugar; rice; wheat; corn; flour; soybean, sunflower, corn, rapeseed cotton seed, peanut oil; certain wood products; paper; orange juice; fertiliser; urea; goat and lamb skins; cotton; wool; and paper products.	
AGREEMENTS WITH SIMPLIFIED PHASE-OUT SCHEDULE				
ASEAN-JPN	2008	10 Years after EIF	5%	
AUS-CHL	2009	10 Years after EIF	5%	Actual full implementation 2015
AUS-MLY	2013	10 Years after EIF	5%	Actual full implementation 2020
AUS-SNG	2003	10 Years after EIF	5%	
AUS-US	2005	10 Years after EIF	5%	
JPN-CHL	2007	10 Years after EIF	5%	
JPN-MLY	2005	10 Years after EIF	5%	
JPN-MEX	2005	10 Years after EIF	5%	
JPN-PER	2012	10 Years after EIF	5%	
JPN-SNG	2002	10 Years after EIF	5%	
JPN-VNM	2008	10 Years after EIF	5%	
MLY-CHL	2012	10 Years after EIF	5%	
SNG-PER	2009	10 Years after EIF	5%	
USA-PER	2009	2025		

Sources: US Congressional Research Service, UNESCAP, New Zealand Ministry of Foreign Affairs and Trade (MFAT).

Appendix V-Scenarios and Data Sources

In this supporting appendix, we review the data, sources and methods for developing our liberalisation scenarios. First we review the tariffs and tariff rate quotas. Then we turn to non-tariff barriers in services and goods trade.

Tariff and Tariff Rate Quotas

Tariffs, and their close cousin, tariff rate quotas, are considered a core element in TPP market access negotiations in goods trade. Both of our scenarios include tariff reductions (Table 2.1). The following section briefly reviews the data and methods we employ to create a consistent set of tariff and TRQs to be modelled in the TPP region.

Tariffs can be levied in different ways, for example, with *ad valorem* or specific duties. The use of specific duties possess a particular challenge for economic modelling, since the values of the specific rates have to be compared to some unit value in order to obtain a common measure of protection. Converting specific protection measures to *ad valorem* equivalents (AVEs), therefore, requires detailed data on unit values. Tariff rate quotas are a special case of tariffs—two or more tariff rates can be charged in a given import category depending on the import volume. TRQs, moreover, can be employed with *ad valorem* rates or specific duties, further complicating their use in economic modelling. To overcome these challenges, international agencies such as the UN, WTO and World Bank have coordinated resources to obtain a universally recognised set of import tariffs and AVEs of specific rates and TRQs.[30] The result is the MAcMap database, benchmarked to the year 2007 (Bouët *et al.* 2004). Although our model is specified with 25 goods sectors (31 including services), tariff negotiations are almost always conducted at the detailed Harmonised Tariffs Systems level with more than 5,000 HTS product lines at the internationally standardised six digit level (HTS-6).[31] The MAcMap data set is well suited to this level of detail, with bilateral trade and protection reported at the HTS-6 level. We specify our tariff cutting formulas at this detailed level, then aggregate, trade weighting, to our 25 sector level.

Tariff negotiations take place in an environment of national policy and industrial interests. For many countries tariffs (and TRQs) are a part of industrial and agricultural policies with long legislative histories. These facts and sensitivities are recognised in the tariff negotiating process by providing flexibilities in reducing or eliminating tariffs. Our analysis incorporates these nuances.[32] We also recognise, although the TPP is an ambitious agreement, that tariff elimination in all sectors may not be

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[30] TRQs are often specified at levels below the internationally recognised Harmonised Schedule (HTS) 6 digit level, requiring some aggregation of these measures with simple tariffs. Moreover, TRQs imply more than one duty in effect over an annual period. The MAcMap database applies the last effective rate (in or out of quotas) which was applied between two countries within a calendar year.

[31] National tariff schedules are often specified in even more detail; however, the use of more detailed product categories is not standardised across countries.

[32] Though we do not explicitly model TRQs in this study.

achieved. Our tariff cutting formulas, therefore, are comprised of three main parameters: 1) the per cent of tariff lines to have tariffs eliminated upon entry into force of the agreement; 2) the number of products to be phased to zero within 10 and 15 years; 3) the number of tariff lines exempt from tariff cutting.

We further stratify the TPP negotiating parties into three groups, recognising that certain countries have a history of lowering tariffs rapidly in trade negotiations (sometimes in return for greater market access in other areas) and that the TPP parties have recognised flexibilities for the developing countries (Mexico, Peru, Malaysia and Vietnam).[33] Table AV.1 lists the three country groups: group A—liberalisers; B—other developed countries; C—developing countries.

Table AV.1
Group definitions for tariff phasing

Group	Countries
Group-A (liberalisers)	Chile, Australia, Brunei, New Zealand, Singapore
Group-B (other developed)	Canada, Japan, United States of America
Group-C (developing)	Mexico, Vietnam, Malaysia, Peru

Source: Authors' analysis.

Tariffs will be phased out based on country groupings. In the scenarios modelled, countries in group "A" implement the TPP tariff reductions most rapidly and with no tariff line exemptions. Country groups "B" and "C" phase tariffs out more slowly (particularly Group C), generally exempting 0.5 per cent of tariff lines (except for dairy, along with beef and sheep, which we treat a little differently, as described in the report). Developing countries are provided two flexibilities: first they are not required to eliminate as many tariff lines at entry into force, and second they are allowed to phase out their existing tariffs over a longer period.

Sensitive Products

As mentioned earlier, our tariff cutting approach recognises the flexibilities that may be required to address politically sensitive product categories when negotiating a trade agreement. The practice of exempting politically sensitive products from trade agreements is deeply embedded in both multi-lateral and preferential trade agreement history. Starting as early as the General Agreement on Tariff and Trade (GATT) Kennedy and Tokyo Rounds, members frequently withdrew product specific offers at the end of the negotiation process. In later agreements, the process was modified to recognise *ex ante* that certain products would be withheld from liberalisation (Baldwin 1986, pp. 385-6). Preferential trade agreements, such as the TPP, have frequently included product exemptions and such exemptions have become firmly embedded in many preferential agreements of which TPP parties are members.[34]

The inclusion of sensitive products in a trade agreement can have substantial impacts on national welfare and GDP impacts. Selecting these products ahead of the conclusion of negotiations is sometimes difficult for economists to predict and model. Jean *et al*. (2008) propose a tariff revenue

[33] United States Trade Representative www.ustr.gov/about-us/press-office/fact-sheets/2011/november/outlines-trans-pacific-partnership-agreement.
[34] See Appendix IV for a list that includes significant preferential trade agreements TPP parties are members to, and the sensitive products exempt from those agreements' tariff reductions.

formula for identifying politically sensitive products which might be excluded from standard tariff cutting formulas, as a robust method for incorporating these essential aspects into economic modelling. We employ this same method in selecting sensitive products for the current study, with two modifications. First, upon reviewing several trade agreements in the TPP region (Appendix IV) it is clear that the United States, Canada and Japan frequently exempt agricultural products, such as sugar, dairy, meats and grain[35] while other TPP parties exempt manufactures and agricultural goods.[36] Furthermore, we recognise that the United States, Japan, and Canada often exempt or mark TRQs for special phasing or tariff reduction. Any country that maintains TRQs must have notified the WTO in advance, signalling strong domestic interests. Therefore, we first select sensitive products for the US, Canada and Japan from a list of agricultural products notified to the WTO as having TRQs. We then rank those products according to the tariff revenue formula proposed by Jean *et al*. (2008).[37] Appendix VII includes these lists for the United States, Canada and Japan. For countries other than the United States, Canada and Japan, we apply the Jean *et al.* formula to all products, both agricultural and non-agricultural.

Services and Non-Tariff Barriers in Goods Trade

TPP is being heralded as a comprehensive agreement which includes liberalisation in services and NTBs. As discussed earlier, economic measures of services barriers and NTBs are "first generation" estimates. However, given the importance of these areas in the TPP negotiations, we employ these estimates to gain insight into their potential impacts. Table AV.2 includes a summary of our Scenario B which includes non-tariff liberalisation measures in combination with our tariff cuts. In the cases of services trade barriers and NTBs, we simulate "convergence" of standards and regulations to a set of "best in class", as represented by the difference between a given country and mean of TPP members.

To model these reductions in trade barriers, we do not take the nuanced approach of attempting to estimate the underlying mechanics or specific channels of change the reduction in barriers flow through, such as FDI or productivity enhancement (Lakatos and Fukui 2013). Instead, we model the removal of non-tariff barriers as a shift in preferences toward or away from the traded good - this approach is in-line with the trade gap method employed in the estimation of the NTBs, since our method "closes" the trade gap by the amount specified by the barrier to trade, without extending deeper into the production structure of the country or region. The variable in the GTAP model associated with preference shifts is "ams", and we employ this method as detailed in Minor (2013) and Fugazza and Maur (2008). The principal change to the economy is measured as the dead weight gain or loss along with any equivalent surplus to consumers and producers had they had access to the good without the NTB in place. The following three sections briefly review the sources and data limitations.

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[35] Jean *et al.* (2008) recognise that sensitive products are almost exclusively the domain of agricultural product negotiations in the WTO.

[36] In the China-New Zealand FTA, for example, China exempts lumber, wood products, paper and certain paper products, such as cardboard and containers. In the ASEAN Free Trade Agreement (AFTA), sensitive products include textiles and automotive parts, among others.

[37] We append a country's agricultural products to the TRQ list in order to create a continuous list of sensitive products to account for cases where a country may not have a sufficiently long TRQ list to meet the required number of lines in the sensitive product specification.

Table AV.2
Non-tariff barriers (NTBs) and services scenario modelled for Trans-Pacific Partnership (TPP) with 12 Countries

Scenario	Tariff reductions	Goods trade		Services
		Trade facilitation	Behind the border	
Scenario B	As for Scenario A	25 per cent reduction in trade delays (Appendix Table AV.4)	Converge to regional mean (Appendix Table AV.3)	Converge to regional mean (Appendix Table AV.5)

Source: Authors' analysis.

Non-Tariff Barriers in Goods Trade

Non-tariff barriers in goods trade have taken on new importance in trade negotiations, with many concluding that the most significant barriers to trade are no longer tariffs alone. The UN TRAINS database tracks over 50 categories of NTBs at the HTS-6 tariff line level. This extensive database illustrates the complex nature of NTBs and the many forms which they may take, from technical standards, import licensing, exchange rate controls, state trading agencies, price bands, state owned enterprises, sanitary and phytosanitary regulations, to name just a few. NTBs are further complicated by the fact that it is not always clear if a measure is applied equally to domestic production or only to imports.[38] Finally, unlike with tariffs, specific duties and TRQs, available measures of the restrictiveness of these measures are limited; therefore, econometric estimates of the *ad valorem* equivalents of the NTB's trade restrictiveness must be employed. As interest grows in measuring these trade barriers, estimates can be expected to improve, however, current econometric estimates of these barriers and the UN databases these measures rely upon, are considered "first generation" with significant room for improvement in coming years as additional data collection occurs and estimation methods improve. In this report, we utilise a widely used set of "first generation" measures utilising existing data in the UN TRAINS database of NTBs in order to simulate the potential impact of reducing NTBs in the TPP negotiations. It is important to keep in mind that while we believe these estimates to be the best currently available, they are at a relatively early stage of development, therefore, appropriate caution should be taken when interpreting results from the scenario that simulates liberalisation of these barriers.

The estimates we employ for NTBs are from Kee *et al.* (2009) and were compiled primarily by World Bank researchers at the HTS-6 digit level and at an aggregate level of agriculture and non-agricultural products. The NTB measures are estimated using a "trade gap" method, which first estimates trade volumes absent any NTB measures, then attributes the gap in actual vs. estimated trade volumes to NTBs.[39] Quantity estimates of these trade gaps are then converted into *ad valorem* equivalents utilising trade elasticities. Kee *et al.* (2009) employ two broad indexes of NTBs which include technical regulations, monopolistic competition, price and quantity controls. The authors do not estimate these effects separately. The measures also do not distinguish between NTBs which are essential to national safety or health and those which are purposefully erected to limit trade (protection). Nevertheless,

[38] A further extension of this problem is the question of whether NTBs are applied equally to various trading partners.
[39] An alternative method to estimating NTBs is the "price gap" method (Dean *et al*. 2009). The price gap is desirable since it relies on direct observations of the impact of trade barriers, namely the gap between imported and domestic goods prices, controlling for transport costs. Price gap studies are usually conducted on a limited number of products, limiting their usefulness in a global database, such as GTAP.

these data can help to estimate the potential impacts of reducing NTB barriers in the TPP negotiations. Although the NTB database lists estimates at the HTS-6 digit level, we recognise in our data compilation that certain sectors had a limited number of estimates which only comprised a small portion of trade—thus a representation bias could be introduced when aggregating to the GTAP sector level. We therefore elect to apply the second index produced by the World Bank NTB database, the overall trade restrictiveness index (OTRI), which is estimated with the above mentioned AVEs for two broad categories: agricultural and non-agricultural products (NAMA).[40] Table AV.3 summarises the estimates of NTBs by TPP country.

Table AV.3

Overall Trade Restrictiveness Indexes (OTRI) for non-tariff barriers for TPP countries (per cent)

	Overall trade restrictiveness index (OTRI)*		Per cent cut (actual-target) required to attain mean	
	Agriculture & Food	Manufactures	Agriculture & Food	Manufactures
New Zealand	23.0	7.3	2.2	3.0
Australia	28.8	4.2	7.9	0.0
Canada	11.4	2.4	0.0	0.0
Chile	17.2	1.3	0.0	0.0
Japan	23.6	3.8	2.8	0.0
Malaysia**	21.8	6.1	1.0	1.8
Peru	22.5	2.9	1.6	0.0
Singapore***	20.3	0.8	0.0	0.0
United States	14.8	3.3	0.0	0.0
Mexico	26.1	12.3	5.3	8.0
Vietnam**	21.8	6.1	1.0	1.8
Brunei**	21.8	6.1	1.0	1.8
Mean	20.9	4.2	1.9	1.4

Source: Kee et al. 2009. Downloaded April 2014 from http://go.worldbank.org/FG1KHXSP30. Indexes updated by Kee et al. *July 2012.*

**OTRI adjusted to exclude tariffs.*

***Estimated with average for available East Asian and South East Asian countries.*

****Assumed to be the same as Hong Kong.*

Since the World Bank NTB estimates do not differentiate between NTBs which impact domestic and imported goods and those which are in place to protect legitimate public health and risk issues, we take an approach that does not call for the complete removal of NTBs in the TPP negotiations. Instead, we employ a "harmonising" approach to NTBs, where negotiators seek to define common standards and mutual recognition of regional standards and regulations. Therefore, we estimate NTB reductions by assuming TPP parties will harmonise their NTBs to the level of the mean found in the TPP region.

[40] Agricultural product are categorised using a widely accepted WTO definition.

Trade Facilitation

As summarised in the introduction to this report, one of the aims of the TPP negotiators is to improve customs procedures between TPP members so they are transparent and facilitate trade in goods, such that they are released from customs authorities as soon as possible. Greater transparency in customs procedures can be created in a number of ways:

- standardising documentation and procedures between TPP members;
- advanced and publically accessible publications of existing and proposed changes to rules and customs regulations;
- risk based approach to inspections;
- advanced rulings on customs classification and valuation; and
- common rules of origin.

Of course, the reduction and elimination of tariffs themselves will remove a major motivation for customs officials to hold shipments for further inspection and classification—the collection of revenue. The value in clearing customs more efficiently depends on a customer's willingness to pay to receive a good one day sooner than later. For goods such as fashionable apparel, electronics, parts for production or assembly, and products which may perish rapidly, the consumer's and producer's willingness to pay to save time will be higher. For standardised goods, which are readily inventoried, the consumer's and producer's willingness to pay to save time will be lower.

In 2012, the World Bank Doing Business database reported an average customs import and export time of 1.6 days within the TPP region (Vietnam with the highest customs clearance time of four days). In order to estimate the impacts of improved customs clearance times in the TPP region, we estimate the impact of a 25 per cent reduction in customs clearance times on all goods traded in the TPP region. Since our model is based on trade flows measured in values and time is measured in days, we translate the number of days improvement in customs procedures to an *ad valorem* equivalent value our model can utilise. We employ a unique method for estimating the value of one day of time in trade developed by Hummels and Schauer (2013). Hummels and Schauer estimate the value of time in trade at a high level of aggregation. For use in CGE models, such as GTAP, Minor (2013) provides a set of Hummels and Schauer's time value estimates calibrated for use specifically with the GTAP model—a summary of these values as they relate to New Zealand is presented in Table AV.4.[41] However, for modelling purposes, a more detailed data set of bilateral time values at the 31 sector level is used to simulate this scenario and generate our model results.

[41] These data, along with documentation, can be found at www.MyGTAP.org/resources.

Table AV.4
Ad valorem equivalent value of one day reduction in customs delays

	New Zealand	
	Imports	Exports
Rice	0.1	0.1
Sugar (processed and refined)	0.0	0.2
Other grain crops	0.0	0.3
Live animals and stock	1.1	0.5
Beef and sheep meat	0.0	0.2
Other meats	0.1	0.3
Dairy (milk and processed products)	0.2	0.1
Wool (raw and processed)	0.7	0.8
Fruit and vegetables	1.0	0.5
Processed food and beverage	1.3	1.1
Natural resource (raw and processed)	1.3	0.6
Extractive (oil, gas, coal, mining)	1.4	0.7
Light manufactures (textile, apparel, footwear)	0.6	0.7
Heavy manufactures	1.3	1.6
Average	1.2	0.9

Source: Authors' calculation from Minor (2013) and Hummels (2013).

Services Trade Barriers

Since the start of the Uruguay Round of negotiations in the WTO, trade agreements have given increasing attention to services trade. Advances in communications and transportation over the past 20 years have provided greater opportunities for services to be directly traded.[42] Services can be traded in four distinct "supply modes" as defined by the WTO General Agreement in Services (GATS): mode 1—cross-border trade; mode 2—consumption abroad; mode 3—commercial presence; mode 4—presence of natural persons.

As with non-tariff barriers in goods trade, estimating barriers to services trade is indirect as tariffs and quotas are rarely levied on services trade, even if they could be enforced. Instead, services trade, like goods NTBs, are impacted by domestic regulations, market conditions, standards and certifications. Restrictions on foreign direct investment are a major barrier to services trade, since services trade is often facilitated by foreign firms (mode 3). Restrictions on foreign ownership can reduce services trade in sectors as varied as wholesale, retail and telecommunications trade. Standards and licensing requirements can greatly reduce opportunities for cross border trade in financial and insurance services. Air transport agreements reduce the ability of non-domestic air carriers to operate in foreign markets.

As with goods NTBs, measuring the restrictiveness of services barriers presents data and estimation challenges well beyond those posed by tariffs, quotas and specific duties. Data on services trade adds an additional area of uncertainty not found with NTBs in goods trade. Data on services are often derived indirectly from national accounts, not from surveys or customs records. Still, services trade is

[42] Services can also be traded indirectly as value-added content in goods trade.

an important area for economic analysis, since services are increasingly a major source of income and activity in modern economies. Furthermore, services are essential inputs into many goods and are critical for wholesale and retail delivery, not to mention health and wellbeing. The end result is that lowering barriers to services may result in large welfare impacts.

Estimates of services trade barriers, like NTBs, are considered to be in their "first generation" in terms of data on barriers and econometric estimates.[43] Since areas such as FDI can be important to services delivery, CGE models, like the one applied here, are only minimally capable of capturing the important nuances of foreign ownership and foreign affiliate sales (Lakatos and Fukui 2013 and Christen *et al.* 2013). As with the NTB estimates, we employ a set of econometric estimates derived from estimating services trade "but-for" barriers and comparing those flows with observed services flows. Fontagné *et al.* (2011) provide estimates of barriers to services trade in nine services sectors corresponding to the GTAP services sectors. Values are provided for all TPP countries, with the exception of Vietnam and Brunei which we estimate using an average from all available ASEAN countries. The estimates reflect the increase in services trade expected without the services barriers in place.

As with NTBs, it is unlikely all barriers to services will be eliminated. However, as with NTBs, harmonisation, regional standards or mutual recognition of regulations, licensing and ownership are possible in a comprehensive agreement. We, therefore, estimate the reduction in services barriers within the region which would harmonise restrictions to the mean of importers in the TPP region. Table AV.5 lists the *ad valorem* equivalent of these services barriers in the six services sectors employed in our model.

[43] See www.oecd.org/tad/services-trade/towardsaservicestraderestrictivenessindexstri.htm for information on the OECD's efforts to improve services trade data.

Table AV.5

Ad-valorem *equivalents of services barriers in the TPP region and reductions required to reach TPP mean, by sector*

	Other services	Construction	Business, insurance and financial	Air and other transport	Trade and comm.	Government services
AD-VALOREM EQUIVALENTS (AVES) OF SERVICES BARRIERS						
Mexico	--	135.8	65.3	38.9	51.2	38.9
Malaysia	--	8.4	46.1	22.2	51.8	31.6
New Zealand	--	88.1	52.5	26.3	56.3	45.4
Peru	--	159.1	52.0	50.6	83.1	44.4
Singapore	--	67.8	12.0	14.7	10.3	15.0
USA	--	95.4	44.0	19.5	52.9	8.8
Australia	--	126.8	63.2	28.5	54.4	44.4
Canada	--	73.9	29.0	28.0	41.8	35.9
Japan	--	25.7	46.7	30.5	44.5	48.4
Chile	--	133.3	77.3	22.9	44.0	40.3
*Brunei Group	--	46.3	39.3	29.1	46.2	42.9
*Vietnam	--	46.3	47.4	29.1	47.0	42.9
REDUCTION TO AVE TO REACH MEAN IN TPP REGION**						
Mexico	--	44.4	12.3	10.8	1.4	3.6
Malaysia	--	0.0	0.0	0.0	1.8	0.0
New Zealand	--	0.0	1.5	0.0	6.4	10.1
Peru	--	67.7	1.1	21.7	32.6	9.1
Singapore	--	0.0	0.0	0.0	1.9	0.0
USA	--	4.0	0.0	0.8	4.9	0.0
Australia	--	35.4	7.8	0.1	7.3	9.1
Canada	--	0.0	0.0	0.1	0.0	0.6
Japan	--	0.0	0.0	0.0	1.9	13.1
Chile	--	41.9	21.6	0.0	0.0	5.0
*Brunei Group	--	0.0	0.4	0.0	0.7	7.6
*Vietnam	--	0.0	2.1	0.0	1.6	7.6

Source: Fontagné et al. 2011. Trade weighted by the authors using MAcMap 2007 database (Bouët et al. 2004).

**Vietnam and Brunei estimated using other ASEAN countries.*

***Cuts are calculated at the bi-lateral level, trade weighted to the values in the table and are averages of the actual cuts applied.*

Appendix VI-Key Trade Agreements for the TPP Region

	Brunei	Chile	New Zealand	Singapore	USA	Australia	Peru	Vietnam	Malaysia	Mexico	Canada	Japan
Brunei	--	TPSEP	ASEAN-AUS-NZL; TPSEP	ASEAN; TPSEP		ASEAN-AUS- NZL		ASEAN	ASEAN			ASEAN-JPN; JPN-BRN
Chile	TPSEP	--	TPSEP	TPSEP	USA-CHL	AUS-CHL	PER-CHL		MLY-CHL	MEX-CHL	CAN-CHL	JPN-CHL
New Zealand	ASEAN-AUS-NZL; TPSEP	TPSEP	--	ASEAN-AUS-NZL; TPSEP; SNG-NZL		ASEAN-AUS- NZ; AUS- NZL		ASEAN-AUS- NZL	ASEAN-AUS-NZL; NZL-MLY			
Singapore	TPSEP, ASEAN	TPSEP	ASEAN-AUS-NZL; TPSEP; SNG- NZL	--	USA-SGN	ASEAN-AUS- NZ; AUS-SNG	SNG-PER	ASEAN	ASEAN			ASEAN-JPN; JPN-SNG
USA		USA-CHL		USA-SGN	--	AUSFTA	USA-PER			NAFTA	NAFTA	
Australia	ASEAN-AUS-NZL	AUS-CHL	ASEAN-AUS-NZ; AUS- NZL	ASEAN-AUS-NZL; AUS-SING	AUSFTA	--		ASEAN-AUS- NZL	ASEAN-AUS-NZL; AUS-MLY			
Peru		PER-CHL		SNG-PER	USA-PER		--			MEX-PER	CAN-PER	JPN-PER
Vietnam	ASEAN		ASEAN-AUS-NZL	ASEAN		ASEAN-AUS- NZL		--	ASEAN			ASEAN-JPN; JPN-SNG
Malaysia	ASEAN	MLY-CHL	ASEAN-AUS-NZL; NZL-MLY	ASEAN		ASEAN-AUS- NZL; AUS-MLY		ASEAN	--			ASEAN-JPN; JPN-MLY
Mexico		MEX-CHL			NAFTA		PER-MEX			--	NAFTA	MEX-JPN
Canada		CAN-CHL			NAFTA		CAN-PER			NAFTA	--	
Japan	ASEAN-JPN; JPN-BRN	JPN-CHL		ASEAN-JPN; JPN-SNG			JPN-PER	ASEAN-JPN; JPN-VTN	ASEAN-JPN; JPN-MLY	MEX-JPN		--
***China**			CHN- NZL									

*Source: Authors' analysis.*Although China is not a party to TPP negotiations, integrating the New Zealand China FTA into the baseline was considered essential.*

Appendix VII-Sensitive Sectors

Table AVII.1

USA sensitive agricultural products with a tariff rate quota (binding or otherwise) - 2007

		Imports from TPP countries			
HS 6	Description	Import value (Millions of US$ 2007)	Applied Duty (including specific and TRQ rates)	Projected revenue	Per cent sensitive
020230	MEAT OF BOVINE ANIMALS, BONELESS, FROZEN	1,371.0	5.8%	78.85	0.0%
170199	CANE/BEET SUG CHEM PURE SUCROSE REFIND NESOI	217.0	34.1%	74.03	0.0%
210690	FOOD PREPARATIONS NESOI	815.5	7.0%	57.14	0.1%
180620	CHOCOLATE PREP NESOI, IN BLOCKS ETC. OVER 2 KG	462.6	12.0%	55.51	0.1%
190120	MIXES & DOUGHS FOR PREP OF BAKERS WARES HDG 1905	263.1	18.9%	49.75	0.1%
170111	CANE SUGAR, RAW, SOLID FORM, W/O ADDED FLAV/COLOR	165.3	25.0%	41.32	0.1%
230990	ANIMAL FEED PREP EXCEPT DOG OR CAT FOOD, RETAIL PK	146.6	23.5%	34.48	0.1%
040490	PRODUCTS OF NATURAL MILK CONSTITUENTS, NESOI	213.9	15.8%	33.71	0.2%
170490	SUGAR CONFECTION (INCL WH CHOC), NO COCOA, NESOI	685.5	4.4%	30.11	0.2%
040690	CHEESE, NESOI, INCLUDING CHEDDAR AND COLBY	133.4	16.6%	22.17	0.2%
180690	COCOA PREPARATIONS, NOT IN BULK FORM, NESOI	226.0	7.8%	17.53	0.2%
020130	MEAT OF BOVINE ANIMALS, BONELESS, FRESH OR CHILLED	1,020.5	1.6%	16.73	0.2%
190190	MALT EXTRACT; FLOUR, MEAL, MILK ETC PROD ETC NESOI	136.1	11.8%	16.02	0.3%
170240	GLUCOSE & GLUCOSE SYRUP CONTAINING 20-49% FRUCTOSE	30.7	42.4%	13.00	0.3%
170260	FRUCTOSE, NESOI & SYRUP, OV 50% FRUCTOSE IN DRY FM	29.9	35.3%	10.54	0.3%
040590	FATS AND OILS DERIVED FROM MILK, N.E.S.O.I.	30.6	28.8%	8.80	0.3%
210390	SAUCES ETC. MIXED CONDIMENTS AND SEASONINGS NESOI	282.2	2.8%	7.83	0.3%
080440	AVOCADOS, FRESH OR DRIED	490.2	1.1%	5.27	0.4%
040410	WHEY & MODFD WHEY WHET/NT CNCNTRTD CNTG ADD SWEETN	14.7	31.4%	4.62	0.4%
151790	EDIBLE FATS & OIL MIXTURES & PREPAR NESOI, ETC	88.2	4.7%	4.14	0.4%
210120	TEA OR MATE EXTRACTS/ESSENCES/CONCENTRATES & PREPS	76.7	5.4%	4.14	0.4%
170220	MAPLE SUGAR AND MAPLE SYRUP	137.3	2.9%	4.00	0.4%
210500	ICE CREAM AND OTHER EDIBLE ICE, WITH COCOA OR NOT	23.7	13.4%	3.18	0.4%
180632	CHOCOLATE & OTHR COCOA PREPS, NOT BULK, NOT FILLED	44.3	6.8%	3.00	0.5%
040510	BUTTER	14.5	19.5%	2.82	0.5%
040221	MLK/CREAM CNCTRD NT SWTN PWD/OTH SOLIDS OV 1.5% FA	23.0	10.8%	2.47	0.5%
040610	CHEESE (UNRPND/UNCURD) FRSH INCL WHEY CHEESE CURD	10.9	21.8%	2.37	0.5%

		Imports from TPP countries			
HS 6	Description	Import value (Millions of US$ 2007)	Applied Duty (including specific and TRQ rates)	Projected revenue	Per cent sensitive
040520	DAIRY SPREADS	15.3	14.9%	2.28	0.5%
170290	SUGAR, NESOI, INCLUDING INVERT SUGAR & SYRUP	14.0	15.3%	2.15	0.6%
170230	GLUCOSE (DEXTROSE), UNDER 20% FRUCTOSE IN DRY FORM	20.7	10.2%	2.11	0.6%
220290	NONALCOHOLIC BEVERAGES, NESOI	118.6	1.4%	1.71	0.6%
110900	WHEAT GLUTEN, WHETHER OR NOT DRIED	72.7	2.3%	1.69	0.6%
040299	MILK AND CREAM, SWEETENED, CONCEN OR NOT NESOI	28.9	4.4%	1.28	0.6%
190590	BREAD, PASTRY, CAKES, ETC NESOI & PUDDINGS	848.3	0.1%	1.18	0.7%
040390	BUTTERMILK/KEPHIR/CURDLED FERMNTD ACIDFD MLK & CRM	5.0	19.1%	0.96	0.7%
120220	PEANUTS (GROUND-NUTS), RAW, SHELLED, BROKEN OR NOT	1.3	65.8%	0.87	0.7%
240310	SMOKING TOBACCO, WHETHER NOT CONTAIN SUBSTITUTES	2.3	35.2%	0.79	0.7%
190230	PASTA, PREPARED NESOI	32.2	2.3%	0.73	0.7%
190219	PASTA, UNCOOKED, NOT STUFFED ETC., NESOI	110.9	0.6%	0.65	0.8%
210112	COFFEE EXTRACTS/ESSENCES/CONCENTRATES $ PREP	6.8	7.9%	0.53	0.8%
190110	FOOD PREPARATIONS FOR INFANTS, RETAIL SALE NESOI	2.8	16.6%	0.47	0.8%
240120	TOBACCO, PARTLY OR WHOLLY STEMMED/STRIPPED	19.9	2.3%	0.46	0.8%
020120	MEAT, BOVINE CUTS WITH BONE IN, FRESH OR CHILLED	117.8	0.3%	0.35	0.8%
040900	HONEY, NATURAL	74.5	0.5%	0.34	0.9%
040630	CHEESE, PROCESSED, NOT GRATED OR POWDERED	1.7	19.4%	0.33	0.9%
240391	HOMOGENISED OR RECONSTITUTED TOBACCO	0.2	127.5%	0.30	0.9%
040620	CHEESE OF ALL KINDS, GRATED OR POWDERED	1.6	18.1%	0.30	0.9%
040130	MILK & CREAM, NOT CONCNTRD/SWTN, FAT CONTENT OV 6%	5.3	5.6%	0.29	0.9%
020220	MEAT, BOVINE CUTS WITH BONE IN, FROZEN	11.2	2.4%	0.27	1.0%
170191	CANE/BEET SUGAR, REFINED, SOLID, ADDED FLAV/COLOR	51.2	0.4%	0.22	1.0%
190490	CEREALS (NOT CORN) IN GRAIN FORM, PREPARED, NESOI	99.7	0.2%	0.20	1.0%
040310	YOGURT, W/N SWEETENED, FLAVORED OR CNTG FRUIT/COCO	3.4	5.6%	0.19	1.0%
071290	VEGETABLES NESOI & MIXTURES, DRIED, NO FURTH PREP	14.7	1.1%	0.16	1.0%
160250	PREPARED OR PRESERVED BOVINE MEAT ETC. NESOI	25.5	0.6%	0.16	1.1%
240110	TOBACCO, NOT STEMMED/STRIPPED	14.5	0.8%	0.12	1.1%
071310	PEAS, DRIED SHELLED, INCLUDING SEED	21.1	0.5%	0.11	1.1%
040229	MLK & CRM,CNTD,SWTND,POWDR/SOLIDS, OVER 1.5% FAT	11.7	0.8%	0.10	1.1%
020110	CARCASSES/HALF-CARCASSES OF BOVINE ANMLS FRSH/CHLD	39.0	0.2%	0.08	1.1%
240399	MFR TOBACCO & SUBSTITUTES NESOI; TOBACCO EXTR ETC.	0.1	68.8%	0.07	1.2%
100630	RICE, SEMI- OR WHOLLY MILLED, POLISHED ETC OR NOT	3.8	1.6%	0.06	1.2%

		Imports from TPP countries			
HS 6	Description	Import value (Millions of US$ 2007)	Applied Duty (including specific and TRQ rates)	Projected revenue	Per cent sensitive
040640	CHEESE, BLUE-VEINED, NESOI	0.5	9.5%	0.05	1.2%
520300	COTTON, CARDED OR COMBED	1.0	4.3%	0.04	1.2%
071220	ONIONS, DRIED (POWDER ETC), NOT FURTHER PREPARED	0.8	4.1%	0.03	1.2%
040291	MILK AND CREAM, CONCENTRATED, NOT SWEETENED, NESOI	0.7	3.8%	0.03	1.3%
210610	PROTEIN CONCENTRATES & TEXTURED PROTEIN SUBSTANCES	3.6	0.7%	0.03	1.3%
020210	CARCASSES/HALF-CARCASSES OF BOVINE ANIMALS, FROZEN	1.8	1.4%	0.02	1.3%
170112	BEET SUGAR, RAW, SOLID FORM, W/O ADDED FLAV/COLOR	0.0	78.1%	0.02	1.3%
110430	GERM OF CEREALS, WHOLE, ROLLED, FLAKED OR GROUND	17.6	0.1%	0.02	1.3%
240130	TOBACCO REFUSE (WASTE)	0.8	2.3%	0.02	1.3%
180610	COCOA POWDER CONT ADDED SUGAR OR OTHER SWEETENING	39.4	0.0%	0.02	1.4%
110290	CEREAL FLOURS, NESOI	10.4	0.1%	0.02	1.4%
110230	RICE FLOUR	10.1	0.2%	0.02	1.4%
520100	COTTON, NOT CARDED OR COMBED	8.6	0.2%	0.01	1.4%
120210	PEANUTS (GROUND-NUTS) RAW, IN SHELL	0.0	81.9%	0.01	1.4%
040120	MILK/CREAM NT CNCTRD/SWT, FAT CONTENT OV 1% NOV-6%	1.7	0.8%	0.01	1.5%
071120	OLIVES, PROVISIONALLY PRESERVED, INEDIBLE	1.0	1.3%	0.01	1.5%
040899	BIRDS' EGGS NT IN SHELL, FRSH FRZN COOKD WATER ETC	1.5	0.8%	0.01	1.5%
190211	PASTA, UNCOOKED, NOT STUFFED ETC., CONTAINING EGGS	39.6	0.0%	0.01	1.5%
210320	TOMATO KETCHUP AND OTHER TOMATO SAUCES	86.0	0.0%	0.01	1.5%
190410	PREP FOOD, SWELLING/ROASTING CEREAL/CEREAL PRODUCT	227.2	0.0%	0.01	1.6%
071390	LEGUMINOUS VEGETABLES NESOI, DRIED SHELL, INC SEED	1.1	0.8%	0.01	1.6%
151710	MARGARINE, EXCLUDING LIQUID MARGARINE	6.5	0.1%	0.01	1.6%
040811	EGG YOLKS, DRIED, WHETHER OR NOT SWEETENED	1.7	0.4%	0.01	1.6%
520299	COTTON WASTE, NESOI	3.1	0.2%	0.01	1.6%
190420	PREP FOOD FROM UNROASTED CEREAL FLAKES/MIXTURES	53.3	0.0%	0.01	1.7%
040891	BIRDS' EGGS NOT IN SHELL, DRIED, W/N SWEETENED	0.1	3.9%	0.00	1.7%
100620	RICE, HUSKED (BROWN)	0.2	1.3%	0.00	1.7%
071339	BEANS NESOI, DRIED SHELLED, INCLUDING SEED	57.6	0.0%	0.00	1.7%
100640	RICE, BROKEN	2.6	0.1%	0.00	1.7%
410110	BOV HIDES WHOLE NOV 8KG DRD/10KG DRY-SALT/14 KG FR	0.9	0.2%	0.00	1.8%
410121	BOVINE HIDES & SKINS, WHOLE, NESOI, FR OR WET SALT	13.0	0.0%	0.00	1.8%
021090	MEAT & OFFAL, SALTED, DRD, SMKD, INCL FLOUR & MEAL	2.8	0.1%	0.00	1.8%

		Imports from TPP countries			
HS 6	Description	Import value (Millions of US$ 2007)	Applied Duty (including specific and TRQ rates)	Projected revenue	Per cent sensitive
410130	HIDES & SKINS BOVINE ANIMALS NESOI OTHERWISE PRES	8.8	0.0%	0.00	1.8%
410140	HIDES & SKINS EQUINE ANIMALS FRESH/SALTD/DRIED ETC	8.8	0.0%	0.00	1.8%
160100	SAUSAGES, SIMILAR PRDT MEAT ETC FOOD PREP OF THESE	35.2	0.0%	0.00	1.9%
110812	STARCH, CORN (MAIZE)	20.4	0.0%	0.00	1.9%
290544	D-GLUCITOL (SORBITOL)	0.5	0.2%	0.00	1.9%
040210	MLK & CRM,CNTD,SWT,POWDR,GRAN/SOLIDS,NOV 1.5% FAT	3.5	0.0%	0.00	1.9%
121210	LOCUST BEANS, LOCUST BEAN SEEDS FRSH/DRD W/NT GRND	4.7	0.0%	0.00	1.9%
121230	APRICOT PEACH OR PLUM STONES/KERNEL, EDIBLE, NESOI	5.3	0.0%	0.00	2.0%

Source: MAcMap 2007 database. Authors' calculations.

Table AVII.2

Japan sensitive agricultural products with a tariff rate quota (binding or otherwise) - 2007

		Imports from TPP Countries			
HS 6	Description	Import value (Millions of US$ 2007)	Applied duty (including specific and TRQ rates)	Projected revenue	Per cent sensitive
100190	WHEAT (OTHER THAN DURUM WHEAT), AND MESLIN	1,951.6	78.1%	1,524.44	0.0%
100630	RICE, SEMI- OR WHOLLY MILLED, POLISHED ETC OR NOT	220.3	362.9%	799.41	0.0%
020130	MEAT OF BOVINE ANIMALS, BONELESS, FRESH OR CHILLED	1,264.7	38.5%	486.91	0.1%
100300	BARLEY	400.4	107.6%	430.83	0.1%
020329	MEAT OF SWINE, NESOI, FROZEN	1,405.9	29.4%	413.96	0.1%
020319	MEAT OF SWINE, NESOI, FRESH OR CHILLED	1,148.0	29.6%	339.27	0.1%
020230	MEAT OF BOVINE ANIMALS, BONELESS, FROZEN	769.1	38.5%	296.12	0.1%
040410	WHEY & MODFD WHEY WHET/NT CNCNTRTD CNTG ADD SWEETN	54.0	295.8%	159.70	0.2%
100640	RICE, BROKEN	23.6	581.0%	136.89	0.2%
210690	FOOD PREPARATIONS NESOI	378.7	33.0%	124.93	0.2%
190190	MALT EXTRACT; FLOUR, MEAL, MILK ETC PROD ETC NESOI	201.9	56.0%	113.13	0.2%
180620	CHOCOLATE PREP NESOI, IN BLOCKS ETC. OVER 2 KG	183.7	47.9%	87.93	0.2%
170111	CANE SUGAR, RAW, SOLID FORM, W/O ADDED FLAV/COLOR	168.9	47.7%	80.49	0.3%
040510	BUTTER	28.5	246.4%	70.22	0.3%
040221	MLK/CREAM CNCTRD NT SWTN PWD/OTH SOLIDS OV 1.5% FA	44.7	138.1%	61.72	0.3%
040690	CHEESE, NESOI, INCLUDING CHEDDAR AND COLBY	328.3	14.9%	48.91	0.3%
040490	PRODUCTS OF NATURAL MILK CONSTITUENTS, NESOI	22.8	169.2%	38.61	0.3%
190120	MIXES & DOUGHS FOR PREP OF BAKERS WARES HDG 1905	47.9	76.0%	36.39	0.4%
040610	CHEESE (UNRPND/UNCURD) FRSH INCL WHEY CHEESE CURD	207.0	17.4%	36.02	0.4%
020610	OFFAL OF BOVINE ANIMALS, EDIBLE, FRESH OR CHILLED	127.6	24.2%	30.92	0.4%
110710	MALT, NOT ROASTED	130.2	17.8%	23.12	0.4%
080510	ORANGES, FRESH	96.2	23.9%	22.96	0.4%
071339	BEANS NESOI, DRIED SHELLED, INCLUDING SEED	9.7	203.2%	19.81	0.4%
190590	BREAD, PASTRY, CAKES, ETC NESOI & PUDDINGS	113.2	17.2%	19.48	0.5%
040229	MLK & CRM,CNTD,SWTND,POWDR/SOLIDS, OVER 1.5% FAT	16.2	116.9%	18.91	0.5%
020649	OFFAL OF SWINE EXCEPT LIVERS, EDIBLE, FROZEN	23.7	77.9%	18.48	0.5%
071310	PEAS, DRIED SHELLED, INCLUDING SEED	6.4	286.5%	18.46	0.5%
020621	TONGUES OF BOVINE ANIMALS, EDIBLE, FROZEN	137.9	12.8%	17.65	0.5%
040120	MILK/CREAM NT CNCTRD/SWT, FAT CONTENT OV 1% NOV-6%	15.9	107.3%	17.04	0.6%
110819	STARCHES, NESOI	6.7	238.0%	15.90	0.6%

		Imports from TPP Countries			
HS 6	Description	Import value (Millions of US$ 2007)	Applied duty (including specific and TRQ rates)	Projected revenue	Per cent sensitive
160242	PREPARED OR PRESERVED SWINE NESOI, SHOULDERS ETC	170.7	9.3%	15.86	0.6%
100620	RICE, HUSKED (BROWN)	3.2	488.5%	15.80	0.6%
040291	MILK AND CREAM, CONCENTRATED, NOT SWEETENED, NESOI	8.1	169.3%	13.65	0.6%
071332	BEANS, SMALL RED (ADZUKI), DRIED SHELLED, INC SEED	4.3	308.3%	13.21	0.7%
071333	KIDNEY BEANS & WHITE PEA BEANS, DRI SHEL, INC SEED	10.3	128.2%	13.15	0.7%
040390	BUTTERMILK/KEPHIR/CURDLED FERMNTD ACIDFD MLK & CRM	4.1	318.6%	13.09	0.7%
020629	OFFAL OF BOVINE ANIMALS, EDIBLE, NESOI, FROZEN	44.3	28.0%	12.43	0.7%
040299	MILK AND CREAM, SWEETENED, CONCEN OR NOT NESOI	16.4	72.1%	11.86	0.7%
210610	PROTEIN CONCENTRATES & TEXTURED PROTEIN SUBSTANCES	18.9	55.8%	10.53	0.8%
160250	PREPARED OR PRESERVED BOVINE MEAT ETC. NESOI	40.6	24.7%	10.04	0.8%
040620	CHEESE OF ALL KINDS, GRATED OR POWDERED	29.0	33.2%	9.60	0.8%
210390	SAUCES ETC. MIXED CONDIMENTS AND SEASONINGS NESOI	100.6	9.5%	9.51	0.8%
040210	MLK & CRM,CNTD,SWT,POWDR,GRAN/SOLIDS,NOV 1.5% FAT	73.2	13.0%	9.50	0.8%
220290	NONALCOHOLIC BEVERAGES, NESOI	82.5	11.5%	9.48	0.9%
040130	MILK & CREAM, NOT CONCNTRD/SWTN, FAT CONTENT OV 6%	3.2	279.6%	9.05	0.9%
190219	PASTA, UNCOOKED, NOT STUFFED ETC., NESOI	37.1	22.1%	8.21	0.9%
110814	STARCH, CASSAVA (MANIOC)	1.9	409.0%	7.60	0.9%
020120	MEAT, BOVINE CUTS WITH BONE IN, FRESH OR CHILLED	18.6	38.5%	7.16	0.9%
230990	ANIMAL FEED PREP EXCEPT DOG OR CAT FOOD, RETAIL PK	168.2	4.2%	7.09	1.0%
210500	ICE CREAM AND OTHER EDIBLE ICE, WITH COCOA OR NOT	28.4	24.5%	6.97	1.0%
160249	PREPARED ETC. SWINE MEAT, OFFAL, ETC. NESOI	85.4	7.1%	6.02	1.0%
180690	COCOA PREPARATIONS, NOT IN BULK FORM, NESOI	12.6	37.6%	4.74	1.0%
110900	WHEAT GLUTEN, WHETHER OR NOT DRIED	22.3	21.3%	4.74	1.0%
110811	STARCH, WHEAT	17.9	25.0%	4.49	1.1%
040520	DAIRY SPREADS	2.7	163.6%	4.39	1.1%
121230	APRICOT PEACH OR PLUM STONES/KERNEL, EDIBLE, NESOI	2.9	140.9%	4.15	1.1%
160100	SAUSAGES, SIMILAR PRDT MEAT ETC FOOD PREP OF THESE	40.3	10.0%	4.03	1.1%
190530	COOKIES (SWEET BISCUITS), WAFFLES AND WAFERS	19.3	18.4%	3.54	1.1%
121210	LOCUST BEANS, LOCUST BEAN SEEDS FRSH/DRD W/NT GRND	2.5	140.2%	3.48	1.2%
180632	CHOCOLATE & OTHR COCOA PREPS, NOT BULK, NOT FILLED	15.5	22.4%	3.47	1.2%
020714	CHICKEN CUTS AND EDIBLE OFFAL (INC LIVERS), FROZEN	41.9	7.7%	3.24	1.2%
040590	FATS AND OILS DERIVED FROM MILK, N.E.S.O.I.	1.4	231.9%	3.19	1.2%

		Imports from TPP Countries			
HS 6	Description	Import value (Millions of US$ 2007)	Applied duty (including specific and TRQ rates)	Projected revenue	Per cent sensitive
071390	LEGUMINOUS VEGETABLES NESOI, DRIED SHELL, INC SEED	1.8	177.2%	3.14	1.2%
180610	COCOA POWDER CONT ADDED SUGAR OR OTHER SWEETENING	13.7	22.3%	3.05	1.3%
040891	BIRDS' EGGS NOT IN SHELL, DRIED, W/N SWEETENED	13.3	21.3%	2.84	1.3%
170220	MAPLE SUGAR AND MAPLE SYRUP	25.8	10.6%	2.75	1.3%
020220	MEAT, BOVINE CUTS WITH BONE IN, FROZEN	6.9	38.5%	2.65	1.3%
121299	VEGETBLE PRODCTS (INC UNRT CHICORY RT) EDIBLE NESO	1.6	151.4%	2.38	1.3%
121292	SUGAR CANE, FRESH OR DRIED, WHETHER OR NOT GROUND	1.6	151.4%	2.38	1.3%
210120	TEA OR MATE EXTRACTS/ESSENCES/CONCENTRATES & PREPS	4.5	52.2%	2.37	1.4%
040819	EGG YOLKS, FRSH, FRZN, COOKED BY WATER, MOLDED ETC	11.8	20.0%	2.36	1.4%
040630	CHEESE, PROCESSED, NOT GRATED OR POWDERED	5.5	40.0%	2.19	1.4%
170490	SUGAR CONFECTION (INCL WH CHOC), NO COCOA, NESOI	9.8	18.8%	1.84	1.4%
410121	BOVINE HIDES & SKINS, WHOLE, NESOI, FR OR WET SALT	24.0	7.5%	1.80	1.4%
040900	HONEY, NATURAL	7.1	23.8%	1.68	1.5%
040811	EGG YOLKS, DRIED, WHETHER OR NOT SWEETENED	8.9	18.8%	1.67	1.5%
020900	PIG & POULTRY FAT FRSH CHLD FRZN SALTED DRIED SMKD	27.6	6.0%	1.65	1.5%
071290	VEGETABLES NESOI & MIXTURES, DRIED, NO FURTH PREP	21.0	7.3%	1.54	1.5%
190410	PREP FOOD, SWELLING/ROASTING CEREAL/CEREAL PRODUCT	4.8	31.8%	1.52	1.5%
071350	BROAD BEANS & HORSE BEANS, DRIED SHELLED, INC SEED	1.2	124.3%	1.43	1.6%
020110	CARCASSES/HALF-CARCASSES OF BOVINE ANMLS FRSH/CHLD	3.7	38.5%	1.43	1.6%
210320	TOMATO KETCHUP AND OTHER TOMATO SAUCES	7.0	19.2%	1.34	1.6%
410140	HIDES & SKINS EQUINE ANIMALS FRESH/SALTD/DRIED ETC	16.4	8.1%	1.33	1.6%
410130	HIDES & SKINS BOVINE ANIMALS NESOI OTHERWISE PRES	16.4	8.1%	1.33	1.6%
020322	MEAT, SWINE, HAMS, SHOULDERS ETC, BONE IN, FROZEN	7.1	17.9%	1.27	1.7%
071220	ONIONS, DRIED (POWDER ETC), NOT FURTHER PREPARED	13.8	9.0%	1.24	1.7%
120220	PEANUTS (GROUND-NUTS), RAW, SHELLED, BROKEN OR NOT	10.5	10.0%	1.05	1.7%
020210	CARCASSES/HALF-CARCASSES OF BOVINE ANIMALS, FROZEN	2.5	38.5%	0.96	1.7%
151790	EDIBLE FATS & OIL MIXTURES & PREPAR NESOI, ETC	10.3	8.0%	0.82	1.7%
170290	SUGAR, NESOI, INCLUDING INVERT SUGAR & SYRUP	2.3	32.1%	0.73	1.8%
110411	GRAINS, ROLLED OR FLAKED, OF BARLEY	0.4	185.6%	0.67	1.8%
110419	GRAINS ROLLD/FLAKD OF CEREALS, NESOI	0.4	185.6%	0.67	1.8%
020312	MEAT, SWINE, HAMS, SHLDRS, BONE IN, FRSH OR CHLLD	1.4	43.7%	0.62	1.8%
500200	RAW SILK (NOT THROWN)	0.2	334.2%	0.61	1.8%
110429	GRAINS WORKED ETC, OF CEREAL, NESOI	0.5	120.5%	0.54	1.9%

		Imports from TPP Countries			
HS 6	Description	Import value (Millions of US$ 2007)	Applied duty (including specific and TRQ rates)	Projected revenue	Per cent sensitive
110421	GRAINS WORKD (HULLD PEARLD SLICED KIBLD) OF BARLEY	0.5	120.5%	0.54	1.9%
110812	STARCH, CORN (MAIZE)	0.3	156.6%	0.49	1.9%
110230	RICE FLOUR	0.8	59.0%	0.46	1.9%
350211	EGG ALBUMIN, DRIED	8.6	5.3%	0.46	1.9%
151710	MARGARINE, EXCLUDING LIQUID MARGARINE	1.5	29.7%	0.46	2.0%
110720	MALT, ROASTED	3.4	13.1%	0.45	2.0%
190490	CEREALS (NOT CORN) IN GRAIN FORM, PREPARED, NESOI	0.7	56.8%	0.37	2.0%
020622	LIVERS OF BOVINE ANIMALS, EDIBLE, FROZEN	2.9	12.8%	0.37	2.0%
170199	CANE/BEET SUG CHEM PURE SUCROSE REFIND NESOI	0.7	49.4%	0.35	2.0%

Source: MAcMap 2007 database. Authors' calculations.

Table AVII.3

Canada sensitive agricultural products with a tariff rate quota (binding or otherwise) - 2007

		Imports from TPP Countries			
HS 6	Description	Import value (Millions of US$ 2007)	Applied duty (including specific and TRQ rates)	Projected revenue	Per cent sensitive
210690	FOOD PREPARATIONS NESOI	791.0	42.6%	337.29	0.0%
020713	CHICKEN CUTS & EDIBLE OFFAL (INCL LIVER) FRSH/CHLD	162.0	166.0%	268.97	0.0%
180690	COCOA PREPARATIONS, NOT IN BULK FORM, NESOI	197.8	132.5%	262.15	0.1%
160232	PREPARED OR PRESERVED CHICKEN MEAT OR OFFAL, NESOI	128.5	143.4%	184.27	0.1%
190120	MIXES & DOUGHS FOR PREP OF BAKERS WARES HDG 1905	171.6	70.1%	120.24	0.1%
190190	MALT EXTRACT; FLOUR, MEAL, MILK ETC PROD ETC NESOI	98.8	114.3%	112.89	0.1%
040221	MLK/CREAM CNCTRD NT SWTN PWD/OTH SOLIDS OV 1.5% FA	54.2	181.6%	98.44	0.1%
180620	CHOCOLATE PREP NESOI, IN BLOCKS ETC. OVER 2 KG	95.4	88.3%	84.27	0.2%
040700	BIRDS' EGGS, IN THE SHELL, FRESH, PRESERV OR COOKD	46.6	133.8%	62.30	0.2%
020714	CHICKEN CUTS AND EDIBLE OFFAL (INC LIVERS), FROZEN	30.6	184.0%	56.39	0.2%
220290	NONALCOHOLIC BEVERAGES, NESOI	169.3	32.0%	54.25	0.2%
040510	BUTTER	17.1	298.5%	50.95	0.2%
160100	SAUSAGES, SIMILAR PRDT MEAT ETC FOOD PREP OF THESE	66.2	65.4%	43.29	0.3%
040590	FATS AND OILS DERIVED FROM MILK, N.E.S.O.I.	10.5	313.5%	32.92	0.3%
040690	CHEESE, NESOI, INCLUDING CHEDDAR AND COLBY	25.2	122.7%	30.91	0.3%
151790	EDIBLE FATS & OIL MIXTURES & PREPAR NESOI, ETC	59.0	52.1%	30.69	0.3%
040410	WHEY & MODFD WHEY WHET/NT CNCNTRTD CNTG ADD	43.3	69.6%	30.11	0.3%
230990	ANIMAL FEED PREP EXCEPT DOG OR CAT FOOD, RETAIL PK	129.7	20.6%	26.68	0.4%
040210	MLK & CRM,CNTD,SWT,POWDR,GRAN/SOLIDS,NOV 1.5% FAT	12.6	201.5%	25.46	0.4%
020711	MEAT & OFFAL OF CHICKENS,NOT CUT FRESH OR CHILLED	15.4	119.0%	18.38	0.4%
160231	PREPARED OR PRESERVED TURKEY MEAT, NESOI	17.6	95.6%	16.86	0.4%
040130	MILK & CREAM, NOT CONCNTRD/SWTN, FAT CONTENT OV 6%	4.8	292.5%	13.97	0.4%
020727	TURKEY CUTS AND EDIBLE OFFAL (INCLUD LIVER) FROZEN	7.4	161.5%	12.02	0.4%
210500	ICE CREAM AND OTHER EDIBLE ICE, WITH COCOA OR NOT	8.4	135.0%	11.34	0.5%
040620	CHEESE OF ALL KINDS, GRATED OR POWDERED	9.1	122.8%	11.13	0.5%
040630	CHEESE, PROCESSED, NOT GRATED OR POWDERED	6.3	122.6%	7.66	0.5%
020726	TURKEY CUTS & EDIBLE OFFAL (INCL LIVER) FRSH/CHLLD	3.5	165.0%	5.81	0.5%
040291	MILK AND CREAM, CONCENTRATED, NOT SWEETENED, NESOI	1.9	259.0%	4.99	0.5%
040310	YOGURT, W/N SWEETENED, FLAVORED OR CNTG FRUIT/COCO	1.3	237.5%	3.18	0.6%
040390	BUTTERMILK/KEPHIR/CURDLED FERMNTD ACIDFD MLK & C	2.1	129.0%	2.66	0.6%
040299	MILK AND CREAM, SWEETENED, CONCEN OR NOT NESOI	1.0	255.0%	2.63	0.6%
040891	BIRDS' EGGS NOT IN SHELL, DRIED, W/N SWEETENED	2.4	97.2%	2.29	0.6%
020900	PIG & POULTRY FAT FRSH CHLD FRZN SALTED DRIED SMKD	2.1	103.5%	2.17	0.6%
040610	CHEESE (UNRPND/UNCURD) FRSH INCL WHEY CHEESE CURD	1.9	115.3%	2.17	0.7%

		Imports from TPP Countries			
HS 6	Description	Import value (Millions of US$ 2007)	Applied duty (including specific and TRQ rates)	Projected revenue	Per cent sensitive
151710	MARGARINE, EXCLUDING LIQUID MARGARINE	3.1	55.8%	1.74	0.7%
020712	MEAT & OFFAL OF CHICKENS,NOT CUT IN PIECES,FROZEN	0.9	119.0%	1.04	0.7%
021090	MEAT & OFFAL, SALTED, DRD, SMKD, INCL FLOUR & MEAL	2.8	32.8%	0.93	0.7%
020724	TURKEYS, NOT CUT IN PIECES, FRESH OR CHILLED	0.5	154.5%	0.83	0.7%
010592	CHICKENS, WEIGHING NOT OVER 2,000 G EACH	0.7	119.0%	0.81	0.8%
040819	EGG YOLKS, FRSH, FRZN, COOKED BY WATER, MOLDED ETC	1.3	58.4%	0.74	0.8%
040490	PRODUCTS OF NATURAL MILK CONSTITUENTS, NESOI	26.1	2.8%	0.72	0.8%
350211	EGG ALBUMIN, DRIED	0.7	63.2%	0.43	0.8%
010593	CHICKENS, WEIGHING MORE THAN 2,000 G EACH	0.4	119.0%	0.42	0.8%
210390	SAUCES ETC. MIXED CONDIMENTS AND SEASONINGS NESOI	174.8	0.2%	0.39	0.9%
040640	CHEESE, BLUE-VEINED, NESOI	0.3	110.7%	0.33	0.9%
170490	SUGAR CONFECTION (INCL WH CHOC), NO COCOA, NESOI	159.9	0.1%	0.21	0.9%
190230	PASTA, PREPARED NESOI	97.3	0.1%	0.11	0.9%
040811	EGG YOLKS, DRIED, WHETHER OR NOT SWEETENED	0.1	105.0%	0.11	0.9%
190530	COOKIES (SWEET BISCUITS), WAFFLES AND WAFERS	122.9	0.1%	0.09	1.0%
190590	BREAD, PASTRY, CAKES, ETC NESOI & PUDDINGS	503.9	0.0%	0.06	1.0%
020130	MEAT OF BOVINE ANIMALS, BONELESS, FRESH OR CHILLED	353.1	0.0%	0.05	1.0%
160250	PREPARED OR PRESERVED BOVINE MEAT ETC. NESOI	100.5	0.0%	0.04	1.0%
190219	PASTA, UNCOOKED, NOT STUFFED ETC., NESOI	51.8	0.1%	0.03	1.0%
210320	TOMATO KETCHUP AND OTHER TOMATO SAUCES	107.4	0.0%	0.02	1.1%
190410	PREP FOOD, SWELLING/ROASTING CEREAL/CEREAL PRODUCT	204.1	0.0%	0.02	1.1%
190211	PASTA, UNCOOKED, NOT STUFFED ETC., CONTAINING EGGS	10.0	0.1%	0.01	1.1%
071290	VEGETABLES NESOI & MIXTURES, DRIED, NO FURTH PREP	26.0	0.1%	0.01	1.1%
180632	CHOCOLATE & OTHR COCOA PREPS, NOT BULK, NOT FILLED	26.0	0.0%	.01	1.1%
190490	CEREALS (NOT CORN) IN GRAIN FORM, PREPARED, NESOI	61.3	0.0%	0.01	1.2%
210610	PROTEIN CONCENTRATES & TEXTURED PROTEIN SUBSTANCES	30.9	0.0%	0.01	1.2%
350219	OTHER EGG ALBUMIN, EXCEPT DRIED	1.9	0.5%	0.01	1.2%
040520	DAIRY SPREADS	0.0	274.5%	0.01	1.2%
190510	CRISPBREAD	3.2	0.2%	0.01	1.2%
010599	TURKEYS, DUCKS, GEESE, GUINEA FOWLS, LIVE, OV 185G	0.0	77.3%	0.01	1.3%
110290	CEREAL FLOURS, NESOI	6.4	0.1%	0.01	1.3%
110230	RICE FLOUR	6.7	0.1%	0.01	1.3%
170199	CANE/BEET SUG CHEM PURE SUCROSE REFIND NESOI	11.6	0.0%	0.00	1.3%
190540	RUSKS, TOASTED BREAD AND SIMILAR TOASTED PRODUCTS	17.1	0.0%	0.00	1.3%
071310	PEAS, DRIED SHELLED, INCLUDING SEED	12.2	0.0%	0.00	1.3%
020725	TURKEYS, NOT CUT IN PIECES, FROZEN	0.0	154.5%	0.00	1.4%

HS 6	Description	Imports from TPP Countries			
		Import value (Millions of US$ 2007)	Applied duty (including specific and TRQ rates)	Projected revenue	Per cent sensitive
190420	PREP FOOD FROM UNROASTED CEREAL FLAKES/MIXTURES	7.8	0.0%	0.00	1.4%
110813	STARCH, POTATO	0.8	0.3%	0.00	1.4%
071220	ONIONS, DRIED (POWDER ETC), NOT FURTHER PREPARED	15.6	0.0%	0.00	1.4%
170290	SUGAR, NESOI, INCLUDING INVERT SUGAR & SYRUP	6.4	0.0%	0.00	1.4%
180610	COCOA POWDER CONT ADDED SUGAR OR OTHER	3.7	0.0%	0.00	1.5%
190110	FOOD PREPARATIONS FOR INFANTS, RETAIL SALE NESOI	70.2	0.0%	0.00	1.5%
240399	MFR TOBACCO & SUBSTITUTES NESOI; TOBACCO EXTR ETC.	15.3	0.0%	0.00	1.5%
520300	COTTON, CARDED OR COMBED	2.7	0.0%	0.00	1.5%
170240	GLUCOSE & GLUCOSE SYRUP CONTAINING 20-49% FRUCTOSE	8.4	0.0%	0.00	1.5%
110314	GROATS AND MEAL OF RICE	2.5	0.0%	0.00	1.6%
110319	GROATS AND MEAL OF CEREAL, NESOI	2.5	0.0%	0.00	1.6%
110312	GROATS AND MEAL OF OATS	2.5	0.0%	0.00	1.6%
110419	GRAINS ROLLD/FLAKD OF CEREALS, NESOI	1.0	0.0%	0.00	1.6%
110411	GRAINS, ROLLED OR FLAKED, OF BARLEY	1.0	0.0%	0.00	1.6%
170260	FRUCTOSE, NESOI & SYRUP, OV 50% FRUCTOSE IN DRY FM	34.2	0.0%	0.00	1.7%
110819	STARCHES, NESOI	1.1	0.0%	0.00	1.7%
071332	BEANS, SMALL RED (ADZUKI), DRIED SHELLED, INC SEED	0.5	0.0%	0.00	1.7%
121230	APRICOT PEACH OR PLUM STONES/KERNEL, EDIBLE, NESOI	0.2	0.1%	0.00	1.7%
121210	LOCUST BEANS, LOCUST BEAN SEEDS FRSH/DRD W/NT GRND	0.2	0.1%	0.00	1.7%
110429	GRAINS WORKED ETC, OF CEREAL, NESOI	1.4	0.0%	0.00	1.8%
110421	GRAINS WORKD (HULLD PEARLD SLICED KIBLD) OF BARLEY	1.4	0.0%	0.00	1.8%
110900	WHEAT GLUTEN, WHETHER OR NOT DRIED	4.2	0.0%	0.00	1.8%
240310	SMOKING TOBACCO, WHETHER NOT CONTAIN SUBSTITUTES	4.3	0.0%	0.00	1.8%
071339	BEANS NESOI, DRIED SHELLED, INCLUDING SEED	10.1	0.0%	0.00	1.8%
040899	BIRDS' EGGS NT IN SHELL, FRSH FRZN COOKD WATER ETC	1.2	0.0%	0.00	1.9%
110430	GERM OF CEREALS, WHOLE, ROLLED, FLAKED OR GROUND	1.3	0.0%	0.00	1.9%
170111	CANE SUGAR, RAW, SOLID FORM, W/O ADDED FLAV/COLOR	31.4	0.0%	0.00	1.9%
121299	VEGETBLE PRODCTS (INC UNRT CHICORY RT) EDIBLE NESO	0.1	0.0%	0.00	1.9%
121292	SUGAR CANE, FRESH OR DRIED, WHETHER OR NOT GROUND	0.1	0.0%	0.00	1.9%
170230	GLUCOSE (DEXTROSE), UNDER 20% FRUCTOSE IN DRY FORM	53.1	0.0%	0.00	2.0%
100190	WHEAT (OTHER THAN DURUM WHEAT), AND MESLIN	6.2	0.0%	0.00	2.0%
110329	PELLETS OF CEREAL, NESOI	0.7	0.0%	0.00	2.0%
110321	PELLETS OF WHEAT	0.7	0.0%	0.00	2.0%
170191	CANE/BEET SUGAR, REFINED, SOLID, ADDED FLAV/COLOR	1.8	0.0%	0.00	2.0%

Source: MAcMap 2007 database. Authors' calculations.